Best Practice Guidelines for
Department of Education and Training
Occupational Therapists:

Supporting Students with Sensory Processing Challenges
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Acknowledgements

This document is an initiative of the Department of Education and Training (DET). It's purpose is to identify and promote evidence-informed practices in contemporary school-based occupational therapy and enhance the education programs of students with disabilities who have sensory processing challenges.

A Reference Group consisting of occupational therapists knowledgeable in this specific area of practice provided critical guidance during the development of these guidelines. A Working Group was formed to provide expert advice, direction and contributions to the document. The group also had access to the expertise of the wider network of DET occupational therapists. In addition, an Expert Panel of practitioners and researchers provided invaluable direction for this initiative.

Professional network discussion groups, focus groups, a survey, and consultation with professional supervisors and Occupational Therapy Advisers based at the Disability Services Support Unit were employed to help ensure the guidelines address the real and current needs of school-based occupational therapy practitioners in the department.

Members of the project group and expert collaborators are listed in Appendix 1.
Supporting students with disabilities with sensory processing challenges is an area that has been identified by DET school-based occupational therapists and professional supervisors alike, as requiring specific attention in order to ensure quality of service and confidence in practice.

Occupational therapists are concerned about sensory processing challenges that interfere with everyday life including participation at school. Information about sensory processing can be confusing and even conflicting. This particular field has been plagued by significant differences of opinion and controversies. Widely promoted and practiced approaches may have limited or no empirical support. Many of sensory-based interventions are being marketed directly to families (May-Benson & Koomer, 2008). The myriad of marketing materials and published information available can be challenging for practitioners and other team members to critically evaluate. This is exacerbated by the large volume of information of varying quality in this area of practice. The proliferation of new theories and information about sensory processing over the past decade means practitioners must be vigilant about keeping current in the latest research, sharing this information with each other and measuring outcomes.

Certain approaches or 'treatments' have the potential to be unhelpful or even harmful for students (see Evidence Review, p.7), despite exhibiting some promise and applicability. Risks may include adverse side effects, compromised student or staff safety, social stigmatisation, a waste of resources such as time, money, and energy for the student and their education team. These risks can result in compromised student participation, instructional time and educational achievement.

There is a need for consistency in school-based occupational therapy services. Inconsistency of practice across the state because of the influence of past and emerging theories and evidence on practice in this area is possible. Best practice guidelines can provide a framework for the development of consistent occupational therapy services to students with sensory processing challenges and support therapists to develop confidence in therapeutic reasoning.

The publication of these best practice guidelines is intended to provide a clear, evidence-informed framework that will support the clinical reasoning of practitioners, as well as support consistency of practice across the state. The guidelines provide a framework from which school-based occupational therapists can make, communicate and evaluate contextually appropriate decisions, to enhance the education programs of students with disabilities who have sensory processing challenges.

These guidelines:

- Provide recommendations for sound practice principles and protocols in school-based occupational therapy services for students with disabilities and sensory processing challenges. They were developed using information gathered from a literature review, descriptions of clinical experiences, expert practitioner reviews and departmental policies and guidelines.
- Provide a reference that assists school-based occupational therapists in making informed practice choices. They provide a clear framework for clinical reasoning and decision-making when supporting students with disabilities with sensory processing challenges.
- Provide information to facilitate joint decision-making and sharing of knowledge between members of the education team. They also encourage explicit and judicious use of current best evidence when making decisions about contemporary occupational therapy practice in schools.
• Identify research gaps, highlight key questions, and focus attention on issues requiring further examination for the continued delivery of high quality, evidence-informed occupational therapy services in Queensland state schools for students with disabilities with challenges in sensory processing.

These guidelines are not intended to:
• be a substitute or replacement for individual therapists’ clinical reasoning.
• dictate practice ‘decisions’ but rather to present summary statements and recommendations to aide decision-making.
• endorse the use of particular ‘programs’.
• be regarded as a sole source of guidance in the field of occupational therapy for children and young people with sensory processing challenges.

These Best Practice Guidelines will require updating and modification over time to be relevant and consistent with emerging scientific literature, outcome research, new intervention strategies and changes in the practice context.

Underpinning Assumptions and Principles

It is recognised and accepted that:
• Occupational therapists:
  o have unique expertise in understanding and addressing the sensory needs of children and young people in their environments in accordance with the knowledge, training, principles and philosophies of the profession.
  o draw-upon and integrate a range of theoretical models and practice frameworks in this practice domain.
  o use professional judgment (explicit, reasoned and organised) as a critical part of sensory processing best practice, based in clinical expertise and experience, training, familiarity with the student and their environment/s.
  o have a professional responsibility to maintain currency of practice and strive to achieve evidence-informed practice.

• School-based occupational therapists strive to promote the development and use of education strategies and practices that foster student success and are most likely to bring about desired student outcomes. Core foundational values underpinning this approach include:
  o team collaboration including families as key throughout service delivery cycle.
  o individualised student and team-centred practice.
  o occupation focussed and educationally-relevant practice aligned with curriculum and context.
  o inclusive, least-restrictive and socially-valid practice.
  o student and staff safety and wellbeing are paramount (for example, risks are assessed and managed including any potential compromise to the students’ educational participation).

• Students with disabilities who experience challenges in sensory processing are a heterogeneous group, and as such have diverse educational support needs. Sensory differences are not universal to a particular impairment group and are highly idiosyncratic when present. Therefore, it is essential that education support plans (intervention) be based on individual student strengths and limitations, and individual school contexts.
• Not all sensory processing issues for students with disabilities compromise occupational success at school and therefore not all require occupational therapy input for attaining positive education outcomes.

Evidence Review

Ultimately, evidence-informed practice involves the integration of available evidence and research findings with professional judgment and data-based clinical decision making, along with the values and preferences of team members. This approach to informing practice does not set a prerequisite benchmark about the standard of evidence to be used, but rather involves systematically identifying and appraising the best evidence from a variety of forms including qualitative and quantitative findings.

The purpose of this review of occupational therapy services for students with sensory processing challenges was to identify the most effective models of best practice for occupational therapists working for DET.

Several important considerations influenced selection and examination of the evidence, in particular:

  o the multi-dimensional, multi-professional approach to the education of students with disabilities with sensory processing challenges.
  o the multitude of sensory, behavioural or educational ‘treatments’ reported.
  o differences in terms of the type of disability, educational impacts and implications.
  o the lack of precision in terms of the terminology used to describe sensory issues, models and intervention techniques.
  o varied definitions of what constitutes ‘successful’ outcomes and the variable measures employed to assess change or goal attainment.
  o difficulty in comparing or measuring outcomes in an empirically valid and reliable way across diverse populations of students experiencing sensory processing challenges and different intervention methodologies.
  o considerable variance in terms of the quantity, quality, and consistency of available published and unpublished works.
  o the complex nature of sensory processing challenges and impacts on learning, behaviour and occupational performance requiring therapists to draw upon and reason across a range of frameworks and bodies of professional knowledge.

The challenges encountered in this review included:

  o summarising the large amounts of evidence available while developing DET OTs’ understanding of what has and has not yet been researched.
  o considering and discussing the empirical soundness or otherwise of this evidence.
  o suggesting how this relates to DET OT practice where possible.
  o highlighting the need for more empirically sound research to inform practice.

Therefore, a broad selection of evidence was reviewed. The process involved identification and analysis of all levels of available evidence on the topic, including practice-based evidence or outcomes measurement, published and unpublished literature, existing guidelines and practice statements, experiential evidence collected from networks, focus groups and expert practitioners and data collection regarding current practices (Refer Appendix 8: Examining Sensory Processing
EVIDENCE REVIEW: Ayres Sensory Integration®

Sensory Integration is a theory developed by Jean Ayres in the early 1970's grounded in the neuroscience and occupational therapy knowledge of the day. It was designed for children with ‘minimal brain dysfunction’ (also known as Developmental Coordination Disorder or Learning Difficulties) and may sometimes be referred to as “Classical” Sensory Integration (Parham & Mailloux, 2005). Sensory integrative therapy is described as a sensory-motor treatment providing the child with planned and controlled sensory experiences that aim to produce adaptive and functional responses to sensory stimuli. It is a resource intensive therapy involving large pieces of specialised equipment and intensive direct therapy with the child. Practice is typically conducted by occupational therapists who have undertaken further specialised training in sensory integration.

Sensory Integration is perhaps the singularly most researched area of clinical practice in paediatric occupational therapy, including more than six published systematic reviews. Despite research dating back forty years, there remains controversy and disunity in the occupational therapy profession regarding the efficacy of this approach (Dawson, 2000; Dempsey, 2001; Schaaf, 2005; Parham, 2007). In addition, there is ongoing scrutiny by other professional groups such as educators (Hyatt, Stephenson & Carter, 2009), calling into question educational practices that incorporate ‘discredited interventions’.

Study results published in the 1970s and early 1980s demonstrated promise, however as research methodologies have become more rigorous, results have been less favourable (Kathrada, 2009). Favourable reporting includes descriptive articles (Olson 2004); studies (Case-Smith & Bryan, 1999; Stonefelt, 1998; Cohn, 2001); research reviews (Mulligan, 2003; Schaaf, 2005); case reports (Kinnealey, 1998) and anecdotal parental reports. However, given the limitations of research design in the studies available, they are insufficient to contribute to the body of empirical knowledge on treatment efficacy (Kathrada, 2009). The neurological theory behind Ayres Sensory Integration® is not well accepted (Barenek, 2002; Perry, & Condillac, 2003; Roberts, 2003). While there are some studies which show modest effects, studies were poorly controlled with numerous methodological problems, and therefore, demonstrated weak evidence (Baranek, 2002; Dawson & Watling, 2000; Vargas & Camilli, 1999).

Validity of sensory integration outcomes studies is also affected by weak fidelity in relation to the therapeutic process (Parham, 2007). An important consideration is that it may not be the ‘therapy’ per se that induces change, but rather other aspects of the environment. That is, child-directed, playful, creative sessions with individual scaffolding from a therapist, include many other possibly beneficial aspects, besides the proposed critical features of sensory integrative therapy (Perry & Condillac, 2003). Therefore, these studies are far from conclusive regarding efficacy of the treatment. In at least one study adverse effects were found with sensory integrative therapy shown to increase self-injurious behaviours (Roberts, 2004). Numerous reviews consistently indicate no robust evidence supporting the efficacy of sensory integrative therapy (Leong & Carter, 2008).

While there is clearly a lack of demonstrated treatment efficacy, this type of therapy remains an enduring practice (Leong & Carter, 2008). It is recognised Ayres Sensory Integration® theory remains part of undergraduate and post-graduate occupational therapy curriculum offerings in Australia and internationally. Many occupational therapists around the globe continue to use...
therapy aimed at sensory integration as a primary intervention practice with children with a range of developmental challenges, believing firmly in the framework (Brown, 2007; Parham, 2007; Pollock, 2006).

In some sectors, including large and influential professional bodies, popularity and promotion of therapy based on Ayres Sensory Integration® theory continues to grow. Occupational therapy researchers including Smith, Press et al. (2005), Watling and Dietz (2007) and Miller, Coll & Schoen (2007) continue to investigate and report positive occupational performance outcomes, despite criticism of study design and the interpretations drawn from the work.

Several occupational therapy researchers and authors have progressed approaches beyond “Classical” Sensory Integration, and with significant advances in neuroscience continue to expand and build upon Ayres’ original hypotheses (Bauman, 2005). Careful consideration needs to be exercised in interpreting the evolving perspectives and approaches which incorporate aspects of Ayres Sensory Integration®.

Several of these have altered the boundaries the theory was intended to explain (for example, mild to moderate problems in learning and behaviour non-attributable to frank central nervous system damage or abnormality). An example is Sensory Processing, developed by Winnie Dunn (1991; 2000) to explain the link between the central nervous system, motivation and performance. Sensory Integration should not be considered synonymous with Sensory Processing, Modulation or Sensory Stimulation. (See Review of Sensory Processing Models, p.23).

**Sensory Integration - Key message:**

**Current and cumulative research does not support Sensory Integration (SI) as an effective treatment for children with autism, developmental delays or intellectual impairment; nor has the research been able to sufficiently identify SI as an independent variable responsible for positive change in a child’s behaviours or skills to date.**

SI may be considered an expensive, controversial and at best ‘unproven’ therapy, and as such, should not take away time from proven educational and therapeutic interventions. Application of the techniques outside a research context should not continue (Leong & Carter, 2008).

In addition, intervention/treatment techniques based on Ayres Sensory Integration® theory are not suited for use within the context of inclusive education and collaborative, school-based occupational therapy in Queensland.

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**EVIDENCE REVIEW: Specific Therapressure Protocols**

Two deep-pressure proprioceptive protocols used in occupational therapy practice are the Therapressure Program™ (Wilbarger & Wilbarger, 1991) and the Protective Response Regimen (PRR) (Hanschu, 2002). The Therapressure Program™ has been reprinted and renamed over the past two decades and may be known as the Deep Touch Pressure Protocol, the Wilbarger Protocol or the Sensory Summation Technique.
The developers of both protocols recommend use with individuals who are over-responsive to sensory stimulation (formerly known as sensory defensiveness). No studies of the Protective Response Regimen (PRR) technique were located.

The Therapressure Program™ involves specific brushing using a surgical brush and joint compression techniques in a prescribed manner at 1 ½ to 2 hourly intervals, using consistent and frequent application of very Deep Touch Pressure and Proprioception without noxious input such as scratching or tickling. The developers assert the ‘treatment plan’ must be followed exactly and consistently. The plan includes both deep pressure touch input with a Therapressure Brush to specific areas of the body including the hands, arms, back, legs and feet, and must be followed immediately by joint proprioception/compression input. These techniques are combined with the provision of a Sensory Diet. This Sensory Diet is a planned and scheduled activity program based on a Sensory Integration approach and refers to the “sum of sensorimotor activities necessary for the individual to generate adaptive responses to environmental demands”. A range of tactile and vestibular experiences are prescribed several times per day on the premise of providing the ‘just-right’ combination of sensory input to achieve and maintain optimal levels of arousal. Wilbarger & Wilbarger (2007) advise a specific sensory diet will vary according to an individual’s goals, preferences, resources and limitations. ‘Diets’ are based on the concept that controlled sensory input can affect functional abilities and enhance occupational performance.

In addition to these ‘specific time-oriented activity routines’, adaptations to the sensory qualities of routines, interactions and environments is recommended. The approach was originally developed as an advanced treatment for sensory defensiveness in children aged 2 to 12 years (Wilbarger & Wilbarger, 2007) however, application has broadened significantly to individuals of various ages, with variously diagnosed sensory processing and behavioural issues. The Therapressure Program™ is supposed to be conducted by therapists who have undertaken further specialised training in the technique and requires ongoing supervision by a therapist who has advanced training in the treatment protocol.

The quality of evidence regarding deep-pressure proprioceptive protocols is low (Reder et al, 2009). Foss, et al (2003) reviewed several studies examining the effectiveness of the Therapressure Program™, concluding emergent but weak evidence supporting the program. A small case series by Kimball, et al (2007) examined the effects of a Wilbarger protocol-based procedure and suggested a single application of the protocol may help a child through a stressful event. However, this study has been criticised for multiple flaws including inadequate baseline and post-intervention measurement techniques and oversimplified claims despite variable results. (Loucks, Juster & Pruessnser, 2008). A review by May-Benson (2008) of eleven published and unpublished qualitative, quantitative and anecdotal reports highlighted that all studies consisted of small sample or single subject case studies (variable populations including adults with psychiatric diagnoses). Chapparo & Mora (2009) used a small randomised control study (non-blinded) and reported positive findings in an Australian context with children with severe defensiveness, behavioural disturbance and intellectual impairment.

Proponents of this protocol actively promote this practice. Unfortunately research in the area is limited. The scant studies that do exist have insufficient fidelity to lend support to the use of this intervention approach (Foss et al, 2003). Effectiveness is unable to be determined due to variation in study population, outcomes measures and protocol application (Honaker, 2008). Despite positive case studies, unpublished theses and anecdotal reporting by developers and supporters, there is currently insufficient documented research to substantiate efficacy of this approach.
Specific Therapressure Protocols - Key message:

The current evidence regarding deep-pressure proprioceptive protocols is inconclusive and not sufficient to support application of these techniques. There is **inadequate empirical support to justify occupational therapy application of these approaches in practice** (Heflin & Simpson, 1998; Reder et al, 2009). In addition, the time-intensive and intrusive nature of the approach is largely incompatible with inclusive curriculum and school-based occupational therapy in the Queensland context.

EVIDENCE REVIEW: Touch Therapy/Massage

There is some empirical evidence emerging for massage intervention for young children with autism, in relation to calming and social responsiveness, however, results are inconclusive as some changes were also recorded in the control group.

Escalona et al (2001) examined the impact of massage therapy on twenty children with autism aged three to six years. The treatment group exhibited less stereotypic behaviours than controls, more on-task behaviour and social relatedness during play at school, and experienced fewer sleep problems.

A randomised control trial of Qigong massage treatment for sensory and self-regulation issues in forty-six children with autism, six years and under, exhibited classroom improvement in social and language skills and reduction in ‘autistic’ behaviours, as reported by teachers. (Silva et al, 2009). The authors note that the research is still preliminary and they provide direction for further research.

In both studies, the intervention occurred daily with parent-administered massage after training by massage therapists.

Touch Therapy/Massage - Key message:

Positive findings are noted in two small studies to date, however results are preliminary and inconclusive. This **intervention is not suited to an inclusive education approach and would not be considered socially-valid applied in a school context**. Families of students with autism and sensory processing challenges may wish to keep abreast of future research regarding these interventions, in order to consider application in non-school environments.
EVIDENCE REVIEW: Sensory Diets and Environmental Adjustments

While there is insufficient evidence to support *Sensory Diets* as prescribed in the *Therapression Program™* (Wilbarger, 1997), there is emergent promise for more recent interventions adopting the same name (Leong & Carter, 2008). These involve activities and environmental adjustments designed to complement the individual’s sensory needs. While these interventions are broadly based upon sensory integration theory, application is for a short-term intervention. Generally this is to meet an immediate need, or provide a preventative strategy, such as an intervention used prior to a challenging event (May-Benson & Koomar, 2008).

Clarifying terminology is therefore paramount, to distinguish *Sensory Diets* that involve considered adjustments to environments, school activities and curriculum, in accordance with occupational therapy practice of enabling participation and success through optimising person-environment-occupation fit.

This differs from *Sensory Diets* as the term was first coined by Wilbarger to describe programs that prescribe regular vestibular and tactile activities to ‘normalise’ the sensory systems.

**Sensory Diets and Environmental Adjustments – Key message:**

There is emergent but insufficient evidence to support more recent ‘sensory diet’ approaches involving activities and environmental adjustments designed to complement the individual’s sensory needs (Leong & Carter, 2008).

It is recommended that definitions be clarified and language used to distinguish these approaches from the *Therapression Program™* (Wilbarger, 1997) ‘Sensory Diet’ of specific time-oriented vestibular and tactile activities.

Embedding sensory experiences or adjusting the sensory qualities of key events and environments based on individualised occupation-centred assessment and goal identification is consistent with a top-down and inclusive approach to support occupational success at school. Such sensory programs (‘diets’) are highly individualised programs with activities embedded in everyday occupations. Collaboration with the family, student, and education team for effective curriculum planning is critical.

Measurement of these techniques to determine impacts and outcomes on occupational success at school will add to the available professional knowledge in this domain.

Use of distinct terminology by school-based practitioners to describe these recommendations such as “Sensory Strategies for Learning” or “Sensory Schedule/Timetable” may be considered more fitting to curriculum adjustment in an education context than the original ‘dietary’ constructs and nutritional analogies coined.
EVIDENCE REVIEW: Fidgets and Fiddle Toys

Promoters advocate the use of ‘fidgets’ or ‘fiddle toys’ for supporting self-regulation, attention, learning, behaviour, stress-management, calming the body and mind, and enriching ‘sensory diets’. While widely marketed and utilised for people with sensory processing challenges, there is scant research to date investigating the outcomes of implementation of fidgets and fiddle toys.

Kercood, Gskovic, Lee & Emmert (2007) studied the effects of fine motor movement and tactile stimulation (using a tangle puzzle) on problem-solving in maths of eight primary students with attentional difficulties (without identified disabilities). Results indicated manipulation of the object reduced excessive movement, increased task completion but did not improve accuracy of the problem-solving academic task. Rapport’s (2009) study of twenty-three primary-aged boys, twelve of whom were diagnosed Attention Deficit Hyperactivity Disorder (ADHD), determined that fidgeting behaviours in the ADHD cohort (involving constant movement/wiggling/swivelling in chairs of swinging legs, bouncing and tapping) appeared to assist these children to focus on tasks that challenged working memory. These behaviours appeared to be self-generated and did not involve use of specialised toys or equipment.

Fidgets and Fiddle Toys – Key message:

Research and measurement of outcomes for students with disabilities is currently insufficient to support routine implementation of fidgets or fiddle toys. Indiscriminate application of novel or engaging stimuli presents a risk in terms of distraction from or disruption to the learning task; and the potential for development of habits and rituals which may become stigmatizing or interfere with function.

Careful consideration of fidget or fiddle items is required within the context of “Sensory Strategies for Learning” or “Sensory Supports Schedule/Timetable” of curriculum adjustment. Refer also to Sensory Diets and Environmental Adjustments – Key message.

Use of distinct terminology by school-based practitioners to describe these items for the intended application, such as ‘listening tools’ or ‘learning tools’, may be considered more fitting in the classroom context.

EVIDENCE REVIEW: The Alert Program ®

Williams and Shellenberger (1996) developed this program that combines a cognitive-behavioural approach and sensory integrative elements to support a child’s self-regulation and arousal modulation abilities. The approach however does not seek to alter an individual’s underlying neurological functioning, and as such, is distinct from classical Sensory Integration. Williams and Shellenberger (1996) indicated the program can be modified to meet the individual abilities and needs. In practice, occupational therapists report commonly adapting the program from its original form in order to try to accommodate learners with cognitive and/or language challenges, as well as to address ‘fit’ (including frequency; duration) of the program within particular contexts.
Several authors and researchers advocate application to whole class programs to support self-regulation of all learners in an inclusive, non-stigmatising manner and provide opportunities for group problem-solving, modelling and generalisation (Barnes, Vogel, Beck, Schoenfeld & Owen, 2008; Cahill, 2003). Integration of strategies in daily class routines (e.g. allowing movement breaks by sending the child on errands or arranging rotating class activities) has been identified by teachers to improve classroom attention and behaviour (Raybold, 2003).

Teachers reportedly value the teaching of self-regulation strategies, to enable students to take ownership of their behaviours, especially in relation to their sensory preferences (Patton, Jolivette & Ramsey, 2006; Cahill, 2003). This self-determination is thought to promote the child becoming more aware of and communicating individual needs, and taking responsibility for managing these needs (Agram, Blanchard, Wehmeyer & Hughes, 2001). Research demonstrates that self-regulation strategies generally facilitate acquisition of and maintenance of targeted behaviours (Agram, Blanchard, Wehmeyer & Hughes, 2001). However this has not yet been clearly established in the context of the Alert Program®.

Teachers have reported increased awareness of sensory processing issues during implementation of the Alert Program® and indicated that it helped them to be more perceptive to student’s needs and anticipate triggers, thereby reducing negative behaviours (Barnes, Vogel, Beck, Schoenfeld & Owen, 2008). A shift in classroom management from a traditional behaviour modification approach, to a positive behaviour support model (with inclusion of a wider range of sensori-motor strategies) has been repeatedly noted.

Some authors highlight the risk that students may use strategies inappropriately, for example, avoid work by taking breaks, bouncing on therapy balls etc. (Cahill, 2006; McCrory, 2003). Therefore, teacher and student collaboration is indicated to promote appropriate use of strategies, establish boundaries, and enable successful integration of strategies at school (Cahill, 2006).

Much of the available support for the Alert Program® at this time is practice-based or anecdotal. The program or program concepts continue to be used by different disciplines in varying forms across practice settings, age groups and levels of ability (Laurel, 1997). Small, low level studies suggest some support for the effectiveness of the Alert Program® in the school environment, at an individual or class level. Cahill (2003) reported on the effects of a global classroom management system based on the program, designed by the teacher and occupational therapist, reporting improved behaviour and learning outcomes for all students in the group.

A small pilot study by Alexander and O’Connell (2002) reported reduced anxiety in boys with Asperger’s Syndrome, despite providing no empirical evidence for the program. They maintained use of the sensori-motor strategies associated with the program were effective in altering arousal levels and also decreasing anxiety (Alexander, Cottrell & O’Connell, 2002).

Barnes, Vogel, Beck, Schoenfeld & Owen’s (2008) quasi-experimental study, suggested the Alert Program® was a useful intervention in promoting self-regulation in children with emotional disturbances (specified as difficulties with learning, social relationships and mood, not otherwise explained by health or medical condition). Results indicated that teachers perceived children receiving the intervention demonstrated improvements in self-regulation, task focus, organisation and transitions and coping with sensory input (Barnes, Vogel, Beck, Schoenfeld & Owen, 2008). The study design was characterised by significant limitations such as sampling issues, rater subjectivity and bias, in addition to inappropriate application of the Sensory Profile as an ‘outcome’ measure for a program designed to impact cognitive self-regulation, versus underlying sensory processing.
Preliminary findings from case investigation by DET occupational therapists (2009) indicated students with disabilities with sensory processing challenges increased the amount of time spent on task with implementation of the Alert Program® in the classroom, but did not experience improvement in functional outcomes (e.g. typing skills).

While the published research evidence for the overall program is limited, there is emerging support for the effectiveness of some specific strategies utilised in the context of the program. For example, chewing, alternate seating, weighted products (see related sections).

Alert Program – Key message:

The Alert Program® has been designed specifically for classroom use, and as such lends itself to whole-class inclusive application and curriculum integration. However, much of the support for the program to date is anecdotal and practice-orientated. The available studies have small sample sizes or are case-based, which limits the generalisation of the findings.

The program, even in a modified form, has significant cognitive demands and applicability to different groups of students with disabilities has not yet been adequately established. However, practitioners report ease of ‘fit’ of some of the program concepts within top-down cognitive approaches, which show some initial promise with particular cohorts of students with disabilities (e.g. Aspergers Syndrome).

Research to explore the actual effectiveness of the program, and strategies used, is needed to determine whether the Alert Program® is really an appropriate program for students with sensory processing challenges, or whether it’s popularity is driven by availability and relative ease of application in a classroom setting.

EVIDENCE REVIEW: Alternate Seating

Therapy Balls

Classroom seating on therapy balls has been investigated as a means to support task engagement via enabling increased movement and vestibular input, without the noise, disruption and distraction of rocking, swinging and shuffling classroom chairs.

Therapy balls are purported to provide the student with the ability to engage in movement, thereby assisting maintenance of optimal arousal and enhanced focus (Rapport et al., 2009; Schilling, Washington, Billingsley & Deitz, 2003; Williams & Shellenberger, 1996).

Therapy balls as an alternative to normal classroom seats have been used for varying reasons including promoting tone and back health (Schilling, Washington, Billingsley & Deitz, 2003). Incidental reports of improved attention, in-class sitting and task performance, prompted Schilling, Washington, Billingsley & Deitz’s (2003) study looking at direct effects of therapy balls for children with Attention Deficit Hyperactivity Disorder. Results indicated improved sustained sitting and improved writing legibility when the students were seated on therapy balls that offer enhanced proprioceptive/vestibular stimulation. This was supported by reports from teachers that students

Schilling & Swartz (2004) reported that teachers of students with autism spectrum disorder (ASD) in their study perceived using balls for seating as a socially valid strategy. Results indicated improved in-seat behaviour and task engagement for this study population, however the authors cautioned regarding overgeneralisation of findings. They neither advocated sitting on therapy balls as a replacement for highly structured intervention using evidence based practices, nor suggested this intervention is suitable for all children with ASD.

Borden, (2005) argues that potential benefits of this intervention as suggested by these studies may influence occupational therapy clinical decision-making as she argues there is ‘little or no harm’ and minimal cost to implement the intervention. However, Bagatell, et al. (2010) suggest that some children with ASD and poor postural stability are less engaged when sitting on a therapy ball chair.

Unstable or Inflatable Cushions

Schilling (2006) documented improved in-seat behaviour and productivity (word output) for students with Attention Deficit Hyperactivity Disorder (ADHD) in a nine phase trial of both static (chairs) and dynamic seating (therapy balls and inflated cushions) in two classrooms where all students and teachers participated in the trial. Results indicated no one type of seating was more appropriate for students with or without ADHD, although teachers and the majority of students preferred dynamic seating. The researchers concluded dynamic seating may be a behaviour support for learning opportunities for some students.

Pfeiffer et al (2008) examined the effectiveness of ‘Disc ‘O’ Sit’ Cushions on task attention in students with attentional /sensory modulation difficulties in second grade. The intervention group had cushions placed on their school chairs for 2 hours/school day, during sedentary activities, for a two week period. Positive changes in measures of meta-cognition suggested the intervention supported self-regulation and problem-solving and to a lesser extent, cognitive self-management and monitoring.
**Alternate Seating - Key message:**

Use of therapy ball seating for students with attention deficit and students with autism shows initial promise, however small sample sizes of available studies precludes generalisation of results.

Preliminary findings lend some support to dynamic seating cushions for students with difficulty attending in class, however, the effects on a clinical population (e.g. students with disabilities with attentional difficulties) have not been established with these cushions.

Further study to examine impacts of dynamic seating on school performance and longer term effects is needed (Kennedy, 2006).

Dynamic seating options may present a relatively inexpensive, non-intrusive, easily replicable intervention. Future research needs to examine impact on school performance (i.e. learning outcomes; engagement) while attending and sitting, as well as effects with different disability populations. In addition, careful consideration of potential collateral impacts (e.g. fatigue, musculoskeletal contraindications or postural compromise) must occur in the development of intervention protocols.

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**EVIDENCE REVIEW: Weighted or Compressive Products**

### Weighted Vests

Weighted products have been increasingly utilised in recent years, purported to assist children with sensory integration and attention span issues to enhance functional attention to and participation in tasks (VandenBerg, 2001). The terminology ‘Weighted Therapy’ has been adopted by some occupational therapy practitioners and product suppliers, promoting “a revolutionary and increasingly popular concept in helping children learn to remain calm and reduce stress.” (Lifeskills 4 Kids, 2009).

The rationale presented for the therapeutic use of weighted vests is that vests provide sustained deep pressure (Edelson et al., 1999; Fertel-Daly, Bedell & Hinjosa, 2001; Vandenberg, 2001) believed to have a calming effect on individuals with sensory modulation disorders (Dunn, 1997; Edelson et al., 1999; Lane, 2002; McLure & Holtz-Yotz, 1991). Theories regarding the neurological basis for these strategies are speculative, and the effect of deep pressure is not clearly understood. Most interventions with a sensory integrative basis traditionally promote active engagement of the child in self-managing frequency and intensity of input (Schaaf & Miller, 2005). There are anecdotal reports of the use of self-selected deep pressure by individuals with ASD to help in calming themselves, for example, Gerland (1997) Grandin (1996). However in contrast, weighted vest application is often a passively applied intervention.

Two small studies on using weighted vests in school environments, showed increased attention for on-task behaviour and decreased stimulation (Fertel-Daly, Bedell & Hinjosa, 2001; VandenBerg 2001). Both papers presented a theoretical rationale for linking the sensations from the weighted vest to organising nervous system responses.
VandenBerg’s (2001) study of children with ADHD, found that students’ on-task behaviour improved while wearing weighted vests and students and staff described positive experiences and observations in the classroom (VandenBerg, 2001). This study is limited by small sample size and poor research methodology and therefore has restricted generalisability.

Stephenson & Carter’s (2009) review of available studies into weighted vests concluded there was limited research evidence to support the use of weighted vests as an intervention for behaviours such as hyperactivity and inattention.

In a preliminary study of adults who have sensory sensitivities, researchers reported providing deep pressure in the form of a weighted blanket mediates skin conductance responses to normal levels (Smith, 2005).

Surveys of occupational therapists regarding their use of weighted vests by Olson and Moulton (2004a & 2004b) highlighted the widespread application of the approach in the United States (U.S.), along with the variability in practices. Intervention using weighted vests was reportedly aimed at improving on-task behaviour and attention, or reducing tantrum or rocking behaviours. However, application varied in terms of diagnoses, ages, settings, wearing regimes and concurrency or otherwise with other intervention approaches, such as sensory diets. No standardised protocols or guidelines are available. In addition, there was variability in reports of effectiveness.

Morrison (2004) examined application for students with autism and determined regular use by U.S. school-based occupational therapists with apparent consensus among therapists that the vests were beneficial, despite limited evidence to support their effectiveness. Straw’s (2004) review of four studies highlighted the lack of generalisability to support or refute effectiveness for classroom application for on-task behaviours, and recommended caution in practice. Doughty and Doughty (2008) called for intense scrutiny of the efficacy of weighted vests, given the apparent origin in sensory integrative theory which they uphold as unsubstantiated. The authors criticised occupational therapy practices of undocumented techniques, such as these vests. The single case design study they conducted indicated a weighted vest was ineffective in reducing self-injury in an adolescent with autism. Stephensen & Carter (2009) reviewed seven studies highlighting inconsistencies in findings and concluding that on balance, results indicated weighted vests are ineffective.

Departmental occupational therapists (Education Queensland, 2006) undertook a preliminary investigation into the use of weighted vests with students with ASD. An ABAB case study design was used with four students to examine the effects of using a weighted vest to improve in-seat behavior during a morning session in class. Results indicated no correlation between wearing the weighted vest for 30 minutes and improvement in-seat behaviour. However, teachers surveyed felt there were positive changes in the student’s behavior, reporting greater levels of student participation whilst wearing the vest. Further trials and investigations were recommended to determine the benefits on overall behaviour and levels of participation, as the preliminary trial was limited to measuring in-seat behaviour as a single, measurable variable of behaviour.

**Weighted Blankets**

While use of weighted blankets would appear widely promoted internationally for a range of different populations, research regarding use in paediatrics and more specifically students with disabilities, was not able to be located.
Following the suffocation death of a nine year old boy with autism in a special school in Quebec, a 2008 coronial report in Ottawa, Ontario served to highlight the risks of weighted blankets, as well as raise the lack of scientific evidence to establish the therapeutic value of this intervention. Coroner Catherine Rudel-Tessier asserted that strict ground rules must be respected by those who wish to use this sensory pressure technique. She presented a number of specific recommendations to minimise the risks, and called for investigation, training and guidelines in this area of practice. (See Practice Principle: Identify and Manage Risk, p. 49)

Mullen, Champagne, Krishnamurty, Dickson & Gao, (2008) investigated issues of safety and therapeutic effects of weighted blankets with adults with mental health issues. Based on this work, guidelines for use of weighted blankets were developed, with a disclaimer indicating they not be considered generalisable. Champagne (2009) promotes use of weighted blankets within an approach focussing on therapeutic use of self, sensori-motor activities, sensory modalities and environmental modifications to reduce the use of seclusion and restraint for people with mental health issues and enable self-regulation, calming and coping skills. She recommends that sensory modulation rooms and carts and kits, incorporating weighted products, be developed in collaboration with the clients.

Champagne (2009) presented protocols for use of another proprioceptive intervention 'BeanBag Tapping' for adults with mental health issues, although no efficacy information is available.

**Compression**

McClure and Holtz-Yotz (1991) reported use of deep pressure applied to the upper limbs of a child with autism was effective in reducing self-stimulatory and self-injuries behaviours. Zisserman (1992) reported use of long Lycra® arm gloves reduced self-stimulatory behaviours of a child with autism. These studies do not constitute empirical support for compressive techniques. Despite this, home-sewn garments, pressure products and custom-designed ‘Bear Hug’ body wrap are widely marketed for children with sensory processing disorders.

**Squeeze machine or "hug machine"**

Developed by Temple Grandin, a “hug machine” consists of foam-padded panels that press against the sides of the body when the user pulls a control lever. The effects on children with autism were investigated by Edelson, Edelson, Kerr, and Grandin (1999) providing some empirical evidence that the intervention is possibly beneficial for anxiety and high arousal in this population.

More recently, specialised products (e.g. The Big Hug) are being marketed to ‘calm children when they experience a sensory agitation or break-down’ are purported to have ‘lasting benefits’. Classroom application is being promoted by manufacturers/suppliers, however only anecdotal reports are available to date. In addition, there is no information available about associated risks or appropriate usage protocols for a potentially restrictive and excluding device.
Weighted or Compressive Products - Key message:

There is insufficient empirical support regarding the effectiveness of weighted or compressive products aimed at providing ‘deep pressure’. Small sample sizes and variance in groups limit the ability to generalise preliminary results. There remains insufficient evidence to guide wearing times and optimal weighting or compressive forces. The risk of negative biomechanical stress has not been adequately examined. Further research is required to inform development of specific guidelines and protocols for practice.

At this time these ‘popular’ interventions are not supported by adequate research and should not be routinely recommended in the absence of exhaustive clinical reasoning and caution. Any application of these strategies by departmental occupational therapists must be as a practice ‘trial’ which includes careful monitoring and measurement of intervention outcomes to add to the available body of knowledge.

EVIDENCE REVIEW: Oral Programs

The Oral Tactile Technique (OTT)

The OTT method developed by Patricia Wilbarger (cited in Wilbarger & Wilbarger, 2007), was designed to decrease oral defensiveness. The technique is intended to be carried out in the context of a ‘comprehensive, intense and individualised treatment plan’. The OTT includes three sweeps of moderate touch input across a portion of the front and upper part of the inside of the mouth; followed immediately by gentle pressure down through the lower jaw by pressing the bottom teeth. The procedure is repeated one to three times per ‘session’. The whole technique is completed once before each meal and once between each meal for a total of 6 to 7 times per day.

OTT may or may not be used in conjunction with the Therapressure Program™.

OTT reportedly requires training and ongoing supervision by a therapist who has advanced training in sensory defensiveness. (Wilbarger & Wilbarger, 2007). No studies to support or refute the technique were located.

M.O.R.E. Program (Oetter, Ritcher & Frick 1999)

The M.O.R.E. (Motor; Oral; Respiratory; Eye Control) program is based upon a theoretical framework proposing the suck/swallow/breathe synchrony as critical to aspects of child development. Treatment strategies are designed to improve respiration patterns, self-regulation, postural control, visual motor skills, eating and communication skills. The program is designed to enhance oral/respiratory function. It incorporates a number of direct oral interventions including Wilbarger OTT techniques, Beckman cheek ‘stretches’, vibration and gum ‘rubs’.

The program developers claim that in most instances the ‘readily observable benefits’ of the intervention ‘outweigh concerns’ from principals, teachers, and some parents regarding the program (Oetter & Richter, 2003). In addition to a school book list, students involved with the program receive a grocery list of food and non-food items for classroom use.

No published studies to support or refute the technique were located.
Chewing products

Use of rubber tubing (Exer-Tubing®, designed for exercise resistance) as a ‘Chewy’ for school-aged children with learning and behaviour difficulties was published in the occupational therapy literature in 1992 by Carol Scheerer. This followed the author’s participation in a 1998 workshop where Patricia Wilbarger had suggested the use of the tubing to ‘help organise the nervous system and reduce stress’. Following two years of clinical observations Scheerer reported a ‘calming, organising and focusing effect’, presenting three case studies in support. In addition, it was suggested the tubing can provide a substitute for children who place non-edible items in their mouths.

Since this time there has been a proliferation of products promoted for these purposes, now being custom-designed for oral applications such as jaw rehabilitation, feeding skills development as well as ‘a sensory or behaviour modifying tools’. No studies could be located detailing the implementation of these products for children with sensory processing issues. Guidelines or protocols for use provided by suppliers and manufacturers appear scant and offer only cursory consideration of safety and risk management. (See Oral Programs and Chewing Products, p. 51).

Gum

Research into the use of chewing gum indicated effectiveness as a stress-reduction tool with an adult sample (Leveille, McMahon, Alcantaro & Zibell, 2008). Researchers have also examined the relationship between chewing gum and cognition. Findings suggest that alertness, concentration and ‘working memory’ were enhanced in subjects chewing gum compared to controls. Mastication (chewing) is believed to contribute to higher cognitive information processing, by increasing blood flow and stimulating specific areas of the brain (Leveille, McMahon, Alcantaro & Zibell, 2008).

The findings may lend some support to the oral strategies utilised in interventions such as the Alert Program® in terms of assisting children to change or maintain their levels of arousal to facilitate learning. However, more rigorous research needs to be conducted in this area, in particular in relation to application for students with disabilities.

In addition, introduction of food and non-food items for chewing (e.g. gum) in classrooms is not a generally accepted practice and in some facilities constitutes a breach of school rules or health and safety guidelines. Therefore, the efficacy of such approaches needs to be well established for acceptance within the education context.

Oral programs for sensory processing - Key message:

**Intensive oral-motor interventions** such as The Oral Tactile Technique (OTT) and the M.OR.E. techniques may be considered intrusive and **inappropriate in the classroom context**. Oral-motor techniques may also present a number of occupational health and safety considerations (e.g. infection control; hygiene) requiring careful risk assessment and management.

There is no research evidence available to support implementation of these two particular methodologies.

Incorporation of ‘chewing’ alternatives as a sensory support for learning requires further research.
A range of ‘sound’ or auditory-based therapies including Auditory Integration Training®, Therapeutic Listening®, The Tomatis® Method, and The Listening Program® are widely promoted for people with sensory processing challenges to purportedly improve sensory modulation, sound sensitivities, attention, behaviour, posture, speech and language.

The different programs, while distinct, appear to have a number of similarities. They generally involve intensive application of modified or filtered sounds or music and are most commonly applied with CDs and earphones in home and clinic-based programs.

Several small and methodologically flawed studies have obtained mixed results. Some have indicated benefits, such as Hall & Case-Smith’s (2007) examination of Therapeutic Listening® with ten children with Sensory Processing Disorder, reporting changes on the Sensory Profile in auditory processing and behavioural and emotional responses, and small changes on measures of temporal-spatial skills. There were a number of questionable research design elements including respondent bias in this study. However, large systematic reviews reveal that, on balance, studies fail to sufficiently demonstrate efficacy (Dawson & Watling, 2000; Sinha, Silove, Wheeler, & Williams, 2005 & 2007), and others highlight risks and potential for negative effects (Research Autism, 2009). Potential side effects have been identified to include distress and/or damage to hearing. Several concerns about the safety of the equipment used have been highlighted internationally.

“Sound” or Auditory-Based Therapies - Key message:

There is insufficient empirical support regarding the effectiveness of ‘sound’ or auditory-based therapies. Small sample sizes and heterogeneous groups limit the ability to generalise results.

At this time, these cost and time intensive interventions are not adequately tested or supported by research evidence (Dawson & Watling, 2000; Research Autism, 2009; Sinha, Silove, Wheeler, Williams, 2005 & 2007), safety is not sufficiently established and the protocols are incompatible with an inclusive education context. These approaches should be considered experimental only.
### Figure 1: Summary Table of Evidence Review

<table>
<thead>
<tr>
<th>Empirical Evidence</th>
<th>Sensory Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unsupported</td>
<td>‘Sound’ or Auditory-Based Therapies</td>
</tr>
<tr>
<td></td>
<td>Specific Therapressure™ protocols</td>
</tr>
<tr>
<td></td>
<td>Ayres Sensory Integration®</td>
</tr>
<tr>
<td>Unestablished/ Inconclusive</td>
<td>Fidget and Fiddle Toys</td>
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<tr>
<td></td>
<td>The Alert Program ®</td>
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<td></td>
<td>Weighted or Compressive Products</td>
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<td>Weighted Vests</td>
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<td>Weighted Blankets</td>
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<td>Compression</td>
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<td></td>
<td>Squeeze machine or ‘hug machine’</td>
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<td></td>
<td>Oral-Motor</td>
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<td></td>
<td>The Oral Tactile Technique (OTT)</td>
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<td></td>
<td>M.O.R.E. Program</td>
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<tr>
<td></td>
<td>Chewing Products</td>
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<tr>
<td></td>
<td>Gum</td>
</tr>
<tr>
<td>Emerging</td>
<td>Sensory ‘Diets’ with Environmental Adjustment Focus</td>
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<tr>
<td></td>
<td>Alternate Seating</td>
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<tr>
<td></td>
<td>Therapy Balls</td>
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<tr>
<td></td>
<td>Unstable or Inflatable Cushions</td>
</tr>
<tr>
<td></td>
<td>Touch Therapy/Massage</td>
</tr>
<tr>
<td>Effective</td>
<td>No approaches or ‘treatments’ identified.</td>
</tr>
</tbody>
</table>

### REVIEW OF SENSORY PROCESSING MODELS

**Sensory Processing**

An intensified interest in the concept of sensory modulation has been apparent in the occupational therapy profession over the past decade (Bundy & Murray, 2002), with the work of Winnie Dunn and colleagues and of Lucy Jane Miller and colleagues, examining sensory modulation disorders in a range of populations, receiving the most significant attention.

Sensory processing is the mechanism of organising, making meaning, and responding to sensory experiences (Dunn, 2009). Dunn’s 1997 sensory processing theory and conceptual model hypothesizes an interaction between neurological thresholds (reactivity) and behavioural (self-regulation) responses (Dunn, 1997a) presented on continua. The author argued the interaction of
these two continua provided a method for explaining how children process sensory information and guidance for intervention planning.

Dunn (1999) presented the perspective that everyone has a unique pattern of responses to sensory experiences. She asserted each individual processes sensory information differently within the occupations of daily life and that atypical responses do not necessarily constitute a ‘problem’. Lifestyle adaptation is an effective and adaptive response to suit an individual’s sensory needs and preferences.

The model, initially proposing four main patterns of responding, received some empirical support with results from physiological testing (Brown, Tollefson, Dunn, Cromwell & Filion, 2001). However, a refinement of the model in 2001 illustrated a more fluid relationship between the constructs than the original 1997 quadrant model (Huebner & Dunn, 2001). This Revised Model of Sensory Processing (2001) in particular highlights that sensory seeking behaviours may be associated with either sensory under-reactivity or over-reactivity. That is, ‘sensory seekers’ may have a high or low neurological threshold with each enjoying sensory experiences. Hence the larger area representing sensory seeking, illustrated below.
Figure 3: Revised Model of Sensory Processing Model (Huebner-Dunn, 2001)

Dunn's Model of Sensory Processing - Key Message:

This model aims to link recent research from neurosciences with knowledge about sensory processing within natural environments. There is some preliminary evidence that supports the concept of applying sensory processing knowledge within everyday life. More studies are needed to characterise exactly how this might be done in the most effective manner (Dunn, 2007). Dunn and colleagues continue to further the available body of professional knowledge with ongoing work in the area of sensory processing.

Sensory Modulation

The Ecological Model of Sensory Modulation (EMSM) (Miller et al., 2001) was developed on the assumption that the responses of an individual with sensory challenges can only be understood within the context of their daily life, including constructs of culture, environment, relationships and tasks. Consequently, sensory modulation disorder is purported to result from a mismatch of these contextual/external factors with the individual’s internal dimensions of sensation, and subsequently emotion and attention. Miller et al. (2001) maintain that sensory modulation disorders arise from an underlying deficit in the reception, integration or regulation of sensory stimuli, or a combination thereof. These sensory abnormalities are believed to cause emotional and attention problems.
Miller, Reisman, McIntosh & Simon (2001) conducted research using five cohorts of children and measuring physiological responses to sensory input (skin conductance); behavioural measures of sensory processing (Short Sensory Profile), measures of emotion, behaviour and attention and fine motor/perceptual function. Results lent preliminary support to the EMSM.

**The Ecological Model of Sensory Modulation - Key Message:**

This model explains sensory difficulties as resultant from a mismatch between external environmental factors, with the individual’s internal dimensions of sensation, and subsequently emotion and attention. There is some preliminary evidence that supports the model, however further study is required. Miller and colleagues are continuing active investigation and advocacy for wider recognition of sensory processing disorders within and beyond the occupational therapy profession.

**Summary**

Interventions designed to address sensory processing difficulties should be viewed with due caution in occupational therapy practice. There is limited empirical research, and what does exist is often methodologically weak and/or inconclusive. Control groups, where they exist, sometimes improved as much or more than treatment groups. Careful critique of available studies and existing published ‘appraisals’ is required, because conclusions are often overstated without acknowledging some of the limitations associated with the research designs. The limited or conflicting evidence may create some concern and confusion for therapists. However, departmental occupational therapists are able to respond by completing thorough therapeutic reasoning around the complex, individual and contextual factors influencing the student’s participation, performance and achievement.
Departmental occupational therapists must feel confident to abandon unproven practices, extricate themselves from unsound methodologies, and explicitly communicate evidence to work collaboratively with other team members who may request these intervention approaches.

If education teams choose to pursue implementation of programs with a basis in unproven methods, they should be advised to ensure design with clear and measurable goals and a means of monitoring and evaluating effectiveness (Perry, & Condillac, 2003). Baranek (2002) noted that "the indiscriminate use of any sensory or motor-based intervention is unethical...if necessary...must be prescribed in an individualised manner consistent with functional goals for each child" (p. 419).

To date, as demonstrated in this evidence review, most of the approaches designed to address sensory processing challenges in children, have, at best, equivocal support. There remain many unanswered questions regarding what type of students with sensory processing challenges may respond best to which interventions, optimal durations, frequencies and intensities ("dosage" or "schedule") of the intervention; types/severities of sensory processing challenge which are most amenable to intervention; the long term effects, and importantly, the risks associated with the intervention, including potential risks of educational compromise.

Therefore, the onus is clearly on paediatric occupational therapy professionals to proceed with caution, practicing with due diligence by exhausting the available evidence in making clinical decisions regarding each individual student. First it must be established that the intervention is consistent with the educational and life goals of the individual and the current priorities for that student. In a school-based practice this requires careful consideration of ‘fit’ of any intervention with resources, context and curriculum. The team may need to proceed to negotiating who is the most appropriate service provider, service delivery model and intervention environment/s.

While exercising appropriate caution, school-based occupational therapists can feel empowered with the necessary information to move forward with individualised sensory interventions, enabling positive occupational outcomes for students experiencing sensory processing challenges. Lack of quality evidence in the literature does not necessarily disprove effectiveness of a particular sensory based intervention. Lack of quality evidence is often an indicator of inherent difficulties in controlling variables within this complex area of research. It is also indicative of the need for practitioners to carefully measure intervention outcomes and be confident in critically interpreting and communicating findings to build the body of knowledge available to school-based occupational therapists.

The following sections within these guidelines provide clinical reasoning guidance in the areas of assessment and outcomes, interventions and documentation to support therapists in using best practice principles and ensuring professional integrity and accountability.
SECTION 2: Occupational Therapy Best Practice with Students with Sensory Processing Challenges

INTRODUCTION

The Person-Environment-Occupation Model (PEO) (Law et al, 1996) (see Figure 5) has been used as the underpinning framework for these practice guidelines. The core constructs of this model may be used to consider the elements impacting a student’s occupational performance at school. For example, in the case of a student with autism spectrum disorder who is demonstrating difficulty concentrating in a noisy classroom, the student’s sensory processing may be considered in the “person” element of the model, the noisy classroom in the “environment” element, and the requirement to concentrate on curricula content when fulfilling the “occupation” of student considered to structure reasoning when devising occupational therapy recommendations at school.

Figure 5: Diagramatic representation of the Person-Environment-Occupation Model (PEO) (Law et al, 1996)

However, it is acknowledged that paediatric occupational therapists draw from a range of different models, frames of reference and intervention approaches (Hinojosa & Kramer, 2009), more commonly combining techniques from different approaches than taking a ‘purist’ methodology. A salient example provided by Copley, Bennett & Turpin (2010) highlights that an occupational therapist addressing attention or modulation difficulties in the classroom, may combine biomechanical techniques (e.g. seating/postural adjustments to reduce wiggling and therefore distraction) with a sensory processing approach (e.g. positioning to a quieter area of the classroom and frequent movement opportunities to manage attention). The same therapist may also employ an acquisitional frame of reference for development of self-management (e.g. guided discovery and problem-solving to generate student-selected strategies for task completion).

Winnie Dunn, occupational therapist, continues to advocate the need for occupational therapists to integrate interdisciplinary evidence with sensory processing knowledge to design effective interventions that support children’s participation in everyday occupations. As neurophysiological investigation is getting more sophisticated, new understandings of neuroplasticity, brain dysfunction, and relationships to behaviour are emerging. While there is increasing knowledge of sensory processing patterns (most particularly, in persons with autism spectrum disorder), there remains a paucity of evidence of the occupational and functional implications of atypical sensory processing, particularly in regard to relationship with school function. Two studies have investigated the associations between sensory processing and school performance specifically in a cohort of students with ASD (Ashburner et al, 2008; Zingervich et al, 2009).
Therefore, the PEO Model can be valuable as an overarching organiser when attempting to integrate evidence and information within a person-centred, occupation-focused practice approach in education.

Practice Guidelines in Assessment and Outcome Evaluation for Students with Sensory Processing Challenges

The underscoring tenets of best practice occupational therapy assessment in school-based practice involve evaluation methods which are:

- **Individualised**
  
  School-based occupational therapists need to have a clear understanding of student specific educational goals and occupational roles; as well as the context of the student’s classroom and broader school environment. These goals will strongly shape and individualise the assessment strategy and should be investigated in stage one of the assessment process. *(See Practice Principle: Top-Down Assessment, p. 31)*

- **Inclusive and collaborative**
  
  School-based occupational therapists should make every effort to include the student, parents/caregivers, teachers or other key team members while evaluating the student. A successful assessment strategy considers the experience from the student’s perspective and aims to capture this whenever possible *(Dunbar, 2007; Keller & Kielhofner, 2005)*. This may be enabled through interviews, self-report or questionnaire responses. When these methods are not possible considered clinical reasoning must be used. The inclusion of team members maximises the opportunity for achieving student outcomes.

- **Based on the student’s needs and context**
  
  It is essential to develop an appropriate match between the student, assessment strategies and tasks selected *(e.g. age, functional competencies, ability to self-report, environment etc)*. School-based therapists need to gain a comprehensive understanding of the student’s functional competencies during the assessment process. Assessments need to relate directly to the student’s school occupations.

- **Inclusive of skilled observations of student performance in school occupations and environments**
  
  Assessment should evaluate all environmental factors that help or hinder a student’s access and participation at school. Effective functional assessment focuses on the interactions between the student, as they perform their roles, and his/her environment. This requires data collection in various environments where the student is expected to function. Environmental factors that need to be evaluated during assessment include the supports and adaptations (both physical and human) required to facilitate the student’s access and participation in the education program.

  *Figure 6* is a flowchart that guides the development of an assessment strategy using these principles.
Developing an Assessment Strategy

PURPOSE of assessment

SOURCES of information

Collaboration with team members

Identify educational goals

WHAT ASSESSMENT STRATEGY WILL I USE?

What do I already know?

What do I need to know more about?

Background: Assessment for Students with Sensory Processing Challenges

The past decade has seen the development and marketing of a range of commercially available sensory processing evaluation tools for use by occupational therapists and other 'specialist' personnel. Observational measures of sensory processing, such as Baranek et al’s (2002) Sensory Approach-Avoidance Rating Scale and laboratory tools such as the Sensory Challenge Protocol (Miller, Reisman, McIntosh, & Simon, 2001) have also been developed. Tests measuring physiological responses to sensory events such as electro-dermal testing have also been used for research purposes. Others have challenged the instruments based on occupational therapy theory and developed their own tools (e.g. the Sensory Behaviour Schedule (Harrison & Hare, 2004) created by psychologists in the United Kingdom to assess sensory functioning of adults with autism spectrum disorder).

Traditionally occupational therapists constructed sensory histories of items grouped according to different sensory modalities (Ayres & Tickle, 1980; Fisher, Murray & Bundy, 1991). However Dunn’s Model of Sensory Processing (1999) has lead to assessment tools clustering items on the basis of the individuals’ reactions to sensation (Dunn, 1999; Dunn & Brown, 1997; Dunn & Westman, 2001).

Currently most instruments available for use in the school context are in sensory history or sensory questionnaire format. Sensory processing observational tools specifically designed for use in school settings may offer additional options for school-based occupational therapists in the future. In the meantime, use of skilled ecological observations forms a critical part of the initial evaluation strategy for students experiencing sensory processing challenges.

Occupational therapists must keep abreast of emerging evidence, for example, neuro-scientific findings providing new information about the relationship between atypical sensory responses and over-focused attention in children diagnosed with autism spectrum disorder. It is likely that some atypical responses to sensory experiences by some students with disabilities may in fact be manifestations of a primary difficulty in another domain such as attention-related processing of complex stimuli (Ashburner, 2006; Liss et al, 2006).
It is also necessary for examiners to be mindful of co-morbid conditions, such as obsessive-compulsive or anxiety disorders, neurological conditions (e.g. epilepsy) which may result in the presentation of behaviours of a sensory nature. Exclusion of alternate hypotheses for behaviours perceived to have a sensory origin or function is critically important. Behaviours such as self-injurious or stereotypical behaviours may have a strong social or communicative function, indicate pain or discomfort or may be due to an unrecognised primary sensory (e.g. vision, hearing) impairment.

Increasing evidence about the sensory patterns, responses or tendencies of different populations, with various conditions or disabilities is emerging. School-based occupational therapists must be knowledgeable about the prevalence and patterns reported while exercising caution. Over- attribution of characteristics or assumption about individuals based on knowledge of a population of students can bias clinical reasoning and lead to a “one size fits all” approach.

Similarly, it is important to recognise that assessment results indicating atypical sensory processing should not be interpreted in isolation. Dunn (1999) cautioned that atypical test scores do not necessarily constitute dysfunction. Information on sensory processing styles may complement other information used to develop educational goals only when part of a comprehensive and individualised occupational therapy assessment strategy (see Figure 4).

### Practice Principle: Top-Down Assessment

Departmental occupational therapists need to adhere to a top-down model of assessment as depicted in Figure 5. The student is central to the process. Getting to know and understand the individual student, their roles, contexts, goals and desires is instrumental to therapeutic evaluation.

![Figure 5: Top-Down Model of OT Assessment in Education](image-url)
Stage 1. The first step in this process requires beginning with information gathering about what the student needs or wants to do, through the identification of meaningful educational goals, and the context and environments for these activities. An “occupation-centred” assessment for a student focuses on the extent to which the child is able to engage or participate in the particular occupational roles of a school student. The school-based occupation therapist’s attention needs to be on the student/team goals to enable roles to be fulfilled in various school environments.

Stage 2. The second stage of the process involves identifying the current strengths and barriers (for both the student and environment) to achieving the tasks or goals identified in stage one. This ecological approach may involve evaluation of the sensory attributes of curriculum tasks and school environments to determine the relative fit between the student, the occupation and the environment. Examining how the student performs in range of learning environments and the different demands of the tasks and settings may lead to a hypothesis regarding which sensory processing issues may impact successful participation, or determine other factors impacting participation that are unrelated to sensory processing (e.g. attention; desire to escape activity). (Refer to Practice Principle: Inclusion of Functional Assessment of Behaviours). Barriers to learning that are extrinsic to the individual, as well student’s intrinsic capacities must both be identified to enable examination and interpretation of the impact of tasks or environments on what a student can achieve.

Stage 3. The third stage of the process involves developing strategies to be implemented in the student’s program. (See Section 2: Practice Guidelines in Education Program Planning/Intervention, p. 43). Before recommendations can be linked to a student’s program, desired outcomes need to be clearly defined and measurable. This may warrant further information gathering for base line data. This stage of the assessment process will require a high level of team collaboration with explicit documentation to support the measurement of goals.

Coster (1998) cautioned that discrete underlying components (including sensory function) should be assessed only to the extent that is required to clarify possible sources of difficulty. Dunn (2000) argued that best practice assessment involves conducting component assessment, or as she describes it ‘formal assessment of person variables’ only at the point clarification or verification of the nature of the performance problem is required in order to support successful performance. Cohn & Cermak (1998) state that by focusing primarily on underlying components, occupational therapists have perhaps neglected to explore how sensory functioning affects the everyday occupations of children.

Top-Down Assessment - Key Message:

A top-down approach, where identification of desired outcomes and goals forms the basis for any assessment or intervention (See Section 2: Explicit Identification of Goals and Outcomes, p.33) informs school-based occupational therapists about exactly what and how to assess and subsequently how to intervene.

Specific assessment of sensory processing should only form a part of the school-based occupational therapy assessment strategy in instances where sensory processing has been identified as a barrier, or clearly hypothesised as a potential barrier to learning.
Practice Principle: Explicit Identification of Goals and Outcomes

In accordance with a top-down model, explicit functional goals and outcomes related to sensory processing that are important to the student and his/her team need to be established at the beginning of the process (Mailloux et al., 2007). Determination of goals and administration of a functional outcome measure should precede completion of sensory-specific instruments. This is of paramount importance in a field fraught with uncertain and contradictory evidence for the intervention strategies that may follow evaluation.

Goals and outcome achievement can be determined using formal tools or informal practices. Techniques may include:

- Administration of specific goal-setting and outcome instruments (as detailed below).
- Pre and post test of functional behaviour using assessments such as the Pediatric Evaluation of Disability Inventory or School Function Assessment. (See Appendix 11)
- Administration of standardised assessments (if indicated) to measure progress at appropriate time intervals.
- Work sampling and/or video footage obtained pre and post intervention.

**Goal Attainment Scaling (GAS)** (Kiresuk, Smith, & Cardillo, 1994) is a framework for setting and monitoring goals identified as important to the student and his/her team/family. The goal needs to be expressed in the form of an action or behaviour, which can be clearly stated and observed. The goal is scaled on a five-point scale ranging from 'much less than the expected level of outcome' to 'much more than the expected level of outcome'. Goal Attainment Scaling has been identified as a promising measure for children with sensory processing issues as the individualised nature of the scale makes it an suited to highly individualised occupational therapy interventions (Opp Hofmann, 2009; Pfeiffer & Kinnealey, 2008). This method can be used to measure functional changes including small increments of skill or behavioural change as an outcome of sensory processing interventions, rather than attempting to measure changes in sensory processing patterns which are understood to remain relatively static throughout life. Departmental occupational therapists report that it requires familiarity and practice to become efficient with goal scaling and data collection for goal monitoring requires the engagement of other team members.

**Canadian Occupational Performance Measure 4th edition (COPM)** (Law, Baptiste, Carswell, McColl, Polatajko & Pollock, 2005) is used to identify problem areas in occupational performance, provide a rating of the client’s priorities in occupational performance, evaluate performance and client satisfaction relative to those areas and to measure changes in a client's perception of his/her occupational performance over the course of the occupational therapy intervention.

**Perceived Efficacy and Goal Setting System (PEGS)** (Missiuna, Pollock & Law, 2004) is designed to enable young children with disabilities to self-report their perceived competence in performing everyday activities and to establish meaningful and engaging goals for intervention. The PEGS is most appropriate for children who are chronologically or developmentally 6-9 years of age and too young to utilise traditional questionnaires and other survey instruments. The PEGS comprises an individually administered, pictorial card-sorting task using a forced choice format.

**The Asset-Based Context Matrix (ABC Matrix)** (Wilson, Mott & Batman, 2004) is a contextually based assessment process for young children and their families. Functional information is gathered from parent interview and observations with regard to contextual factors (e.g. the child’s participation in household routines), activity settings (e.g. going for a walk), interests (e.g. toy preferences), assets (capabilities that child uses in everyday settings), functional and meaningful
interactions (e.g. communicating desires at mealtimes), opportunities, current participation and possibilities with regard to the child’s participation in daily activities.

**Paediatric Activity Card Sort (PACS)** (Mandich, Polatajko, Miller & Baum, 2004) is a self-report assessment tool for children aged 5 to 14 years. It is comprised of pictures of children engaged in typical occupations and activities of childhood, including personal care, school/productivity, hobbies/social activities and sporting activities. It can be used to identify occupations that the child is currently doing or occupations that the child wants to, needs to or is expected to do.

**Child Occupational Self Assessment (COSA)** (Keller, Kafkes, Basu, Federico & Kielhofner, 2005) is a semi-formal interview conducted using a checklist or card sort format to assess children’s perceptions of their own sense of occupational competence and how they rate the importance of everyday activities. It can be used for goal-setting and as an outcome measure.

**School Setting Interview (SSI)** (Hemmingsson, Egilson, Hoffman & Kielhofner, 2002) is a student-interview tool designed for use with students with a physical impairment. It examines the level of student-environment fit and the need for environmental adjustments at school.

Dunn identifies the need to measure and document ongoing progress during interventions by measuring children’s participation as the occupational outcome (in Strzelecki, 2008). (See Section 2: Guidelines: Education Program Planning/Intervention, p.43). For school-based therapists this evaluation needs to target the student’s participation at school. Instruments that specifically measure participation such as the *School Function Assessment* can assist greatly in this process.

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**Explicit Identification of Goals and Outcomes - Key Message:**

Determination of goals and administration of a functional outcome measure should precede completion of sensory-specific instruments. This is of paramount importance in a field fraught with uncertain and contradictory evidence for the intervention strategies that may follow evaluation. In the absence of scientific evidence in this domain of practice, **outcome measurement must be embedded in daily practice.**

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**Practice Principle: Multiple Sources of Data**

Investigation drawing upon multiple sources of information is recommended if sensory processing issues are indicated as impacting occupational success. These may include:

- Indicators of need for assessment related to sensory function and additional information provided in the *Request for Service Form*;
- Records review (student reports, medical/therapy reports);
- Interviews with the student about sensory preferences and aversions and impacts on their school lives, concerns and priorities;
- Interviews with the family and other team members about the student’s history, concerns, priorities and their observations of the student’s sensory preferences and aversions;
o Structured and unstructured skilled observations of responses to sensory input across a range of tasks and environments;
o Formal assessments.

Even the developers of sensory assessments such as Winnie Dunn, caution that these instruments cannot be interpreted in the absence of other evaluation techniques. Comprehensive evaluation requires:
o Assessment and analysis of environmental demands;
o Assessment and analysis of behavioural responses;
o Observations in multiple settings;
o Specific sensory assessments;
o Assessment of other component skills as needed (e.g. executive function). (Tomchek, 2001).

Therefore the assessment strategy needs to cover all relevant domains. Assumptions that narrow a therapist’s focus (e.g. to sensory specific domains only) need to be avoided. Therapists should consider gathering information in related domains, for example, executive functioning or behaviour if these areas can assist with describing occupational functioning. Appendix 11: Assessment Tools provides further information of assessments that may be useful.

**Multiple Sources of Data - Key Message:**

Evaluating sensory processing should never occur in isolation. Comprehensive evaluation requires sourcing evaluation data broadly. Occupational therapists need to consider gathering information in other related domains where it is hypothesised that these may be impacting occupational performance (See Section 2 Guidelines: Practice Principle: Top-Down Assessment, p. 31).

**Practice Principle: Considered Selection of Tools to Examine Sensory Processing**

Therapists must complete skilled environmental observations and student and team interviews prior to considering more formal assessments, including administration of sensory processing tools.

Mulligan (2003) reminds occupational therapists of a number of important questions prior to selection of evaluation tools, including:
o Is the purpose of the test consistent with the guiding frame of reference and the philosophy of the practice setting?
o What tests have been administered in the past and what were the results?
o Will the test yield the kind of information the team is looking for?
o Are there more efficient means of gathering the same information?
o Are the administration procedures suited to the student/team?
o How reliable and valid is the test for use in the specific situation?
o What is the competency level for administering the test?
A range of sensory processing related instruments are available to occupational therapists and other ‘specialist’ personnel. It is important that school-based occupational therapists familiarise themselves with the underlying theoretical model on which the tools are based.

It is recommended that standardised instrumentation be used in preference to informal tools, checklists or non-standardised instruments wherever possible.

Where formal tools are unavailable, instruments with consistent and repeatable recording means should be utilised, for example, *Observation of School Environment* (Hanft & Shepard, 2008)

Dunn (1996) asserted the importance of task and environmental analysis in determining relevant sensory issues. She suggests that sensory demands and functions can be inferred by examining the sensory qualities of tasks and environments. (Dunn W. in Orelove & Sobsey, 1996). (See *Environmental Observational Assessments* p. 39.)

A range of commonly used assessment tools are critiqued in brief below. Information provided includes considerations from departmental occupational therapists following trial and application of the instruments. *Appendix 11: Assessment Tools* refers to detailed information on some of the assessment instruments summarised in this section, to guide school-based occupational therapists reasoning and selection. Notably, not all tools that measure sensory processing have comparable psychometric rigor or integrity of underlying constructs and occupational therapists should be discerning in understanding and application of ‘popular’ instruments.

### Sensory Processing Assessment Tools

**Sensory Processing Measure (SPM)** (Parham, Ecker, Miller-Kuhaneck, Henry & Glennon, 2007) is a norm-referenced standardised tool for ages five to twelve years including a Home Form, Main Classroom Form, School Environments Form (Art Class, Music Class, Physical Education Class, Recess/Playground, Cafeteria and School Bus). It is designed to enable collaborative assessment of social participation, praxis and sensory processing issues impacting performance in a multi-environment approach.

This instrument is based upon sensory integration theory, and provides information for two higher level integrative functions - praxis and social participation, and five sensory systems - visual, auditory, tactile, proprioceptive, and vestibular functioning. Within each system, it offers clinical information on processing vulnerabilities, including under-responsiveness and over-responsiveness, sensory-seeking behaviour and perceptual problems.

The tool was standardised on a sample of 1,051 typically developing children. A separate sample of 345 children receiving occupational therapy intervention was used to verify that the SPM scales can differentiate typical children from those with clinical disorders. Psychometric properties reported by the developers in the manual and related studies support the integrity of the tool in reliably and validly measuring sensory processing. Despite these strengths, some departmental practitioners have reported some challenges in adapting to the instrument when very familiar with prior published alternative tools based upon Dunn’s (1997) quadrant Model of Sensory Processing and accustomed to interpreting and reporting results using this particular theoretical model.

**Sensory Processing Measure – Preschool (SPM-P)** (Parham & Ecker, 2010) is a norm-referenced standardised tool for ages two to five years including a Home Form and Preschool Form based on a sample of 651 typically developing children and data from a separate 242 young children receiving occupational therapy intervention. Information from departmental therapists
regarding practice application indicated the items were meaningful and relevant to educators supporting young students in Prep and pre-Prep and as such this tool provides an accessible option in the early childhood context where team members appeared to relate more easily to the questions/items when compared with other assessment tools available for this age group.

**Sensory Profile** (Dunn, 1999) is a judgement based caregiver questionnaire that rates sensory processing, sensory modulation and behavioural and emotional responses that are outcomes of sensory processing. It is most appropriate for children 5 to 10 years, but can be used with 3 and 4 year olds. The authors/developers also aim to provide information on the effect of sensory processing on everyday performance. The **Sensory Profile** (Dunn, 1999) was originally developed as a research tool to test the application of sensory integration theory within consultative services in classrooms (Dunn, 1994; Kemmis & Dunn, 1996).

The nine ‘Sensory Profile Factor Scores’ were derived from a factor analysis on the sample of 1037 children without disabilities (Dunn, 1999). However, what these factor scores represent and how they relate to function is not clear for the practitioner administering the tools and interpreting the results. For example, Factor 7: *sensory sensitivity* includes only four items and all of these appear to be responses that have traditionally been associated specifically with movement sensitivity. They do not include sensitivity to visual, tactile or auditory input. Factor 2: *Emotionally reactive* factor has no items in this factor that relate directly to sensory processing. Low scores on this factor may relate to issues other than atypical sensory processing. It is therefore important in interpretation to not take scores at face value, but rather to go back and examine which individual scores were low, in order to make meaningful and relevant interpretations.

In addition, the logic behind attribution of factor scores to the model’s quadrants is not well explained in the examiner’s manual. Low registration includes *low endurance and muscle tone* without supporting references that children who exhibit low tone necessarily have low registration; *Sensory Sensitivity* includes *inattention and distractibility* again without any evidence to support the argument that children with sensory sensitivity have poorer attention than children who are sensory seeking or sensory avoiding or low registration; *Sensory sensitivity* includes auditory processing but omits visual and tactile sensitivity; *Sensory avoiding* includes items relating to emotional and behavioural responses, thereby presenting the examiner with items and results which can appear contradictory.

The Sensory Profile provides a wide range of valuable qualitative information that may not be elicited through other means, however; the quantitative data yielded can be confusing to interpret. Departmental occupational therapists have highlighted some limitations of application of this assessment tool in the education context, including the home (versus school) focussed nature of items, and the length and language complexity which may present a challenge for some respondents.

Dunn’s original Model of Sensory Processing (1997) provides the theoretical framework for interpreting scores from the Sensory Profile, understanding implications for the individual and designing interventions. Therefore, this instrument does not reflect the more contemporary Revised Model of Sensory Processing (Huebner & Dunn, 2001). However, further information has been made available through the publication of the **Sensory Profile Supplement** (Dunn, 2006). (See *Review of Sensory Processing Models*, p.25).

**Short Sensory Profile** (SSP) (McIntosh et al, 1999) was designed for screening and research purposes and is derived from a subset of the Sensory Profile (Dunn, 1999) items with more valid and reliable scoring and therefore preferred by researchers. However, this abridged version may not offer the comprehensive data and extended qualitative information that some practitioners may be seeking through the evaluation process.
The authors of the SSP removed items considered to be products of sensory modulation such as the social/emotional abilities and motor development. These may involve contaminating issues unrelated to sensory processing. Reliability and validity studies were completed by different authors, thereby reducing potential bias. Construct validity was established using electrodermal responses to sensory stimuli, with children who had abnormal physiological responses to sensory input demonstrating significantly lower scores on the Short Sensory Profile. Items were selected on the basis that they effectively discriminated between a group of typically developing children and a group of children who were identified as having atypical sensory processing but no other disabilities. According to the test developers this suggests the SSP does tap atypical sensory processing rather than other deficits that are common to children with disabilities, such as cognitive impairment (McIntosh et al, 1999).

It is possible to administer the Sensory Profile in its entirety to yield valuable qualitative information, and then to transfer scores to the Short Sensory Profile sheet, as these scores are considered more reliable and may be easier to interpret.

**Sensory Profile: School Companion** (Dunn, 2006) is a tool designed to be completed by teachers to evaluate how a child’s sensory processing skills affect the child’s classroom behaviour and performance. Professionals using the original Sensory Profile indicated an interest in exploring how a child’s sensory processing abilities affected his/her participation in the classroom. The original Sensory Profile was limiting for classroom use, in that it was standardised with caregivers as respondents, not teachers; teachers were unable to respond to items for behaviours not reflected in the classroom environment; and therefore a reliable score could not be obtained when a teacher completed the caregiver questionnaire. This validated the need to develop a measure to assess the impact of sensory processing abilities on a child’s classroom participation, and the School Companion was developed. While it can be used as a stand-alone tool, the authors encourage it to be used in conjunction with the Sensory Profile for a more comprehensive evaluation. Departmental occupational therapists have found some of the ‘School Factors’ can be confusing for teachers and other team members to understand and that significant time investment is required for administration, scoring, interpreting and reporting on this instrument. Item applicability may be limited for students with more complex disabilities and intellectual impairment.

Therapists should be aware that a ‘necessary update’ to the Sensitivity cut scores was made available in October 2009. The supplier of the tool should be contacted if the therapist does not have access to this revised information.

**Sensory Profile Supplement** (Dunn, 2006) is designed to be used in conjunction with The Sensory Profile (Dunn, 1999). It provides expanded cut scores and quadrant cut scores and further general information about problem solving strategies supported by clinical reasoning.

**Infant/Toddler Sensory Profile** (Dunn, 2002) is a judgement-based questionnaire, which aims to evaluate the possible contributions of sensory processing to the infant/toddler’s daily performance patterns. It is designed for infants and toddlers from birth to three years and to be applicable to children with all types of disabilities. Professionals indicated a need for a tool to be used with younger children and in response the Infant/Toddler Sensory Profile was developed. Initial studies indicate that this tool’s properties are sufficient to make reliable and valid inferences about a young child’s sensory processing. Further studies would strengthen the clinical validity and evidence to support use of the instrument. This instrument is based upon the Revised Model of Sensory Processing (Huebner & Dunn, 2001).

**Adolescent and Adult Sensory Profile** (Brown & Dunn, 2002) is a self-report questionnaire that yields four quadrant scores – low registration, sensation seeking, sensory sensitivity and sensation
avoiding. Professionals indicated a need for a tool to be used with older clients and the *Adolescent/Adult Sensory Profile* was developed in response. It is not suitable for students who are unable to self-report, and item applicability may be limited for students with more complex disabilities and intellectual impairment. This instrument is based upon the Revised Model of Sensory Processing (Huebner & Dunn, 2001).

**Sensory Integration Inventory - Revised for Individuals with Developmental Disabilities** (Reisman & Hanschu, 1990) (all ages) is a guide to observation of the student's tactile, vestibular and proprioceptive reactions. This is a non-standardised instrument and does not yield scoring.

**Ayers Clinical Observations** (Ayres, 1972) is a series of nineteen behavioural or developmental patterns initially proposed by A. Jean Ayers in *Sensory Integration and Learning Disorders* (1972) designed to be administered in conjunction with the original *Southern California Sensory Integration Test*. It is an individually administered, non-standardised, observational scale, of component skills. The procedures have not been validated adequately through research (Mulligan, 2003). The data yielded is subjective, lacking in psychometric significance and of limited relevance to an educational context.

**Clinical Observations of Motor and Postural Skills Second Edition (COMPS)** (Wilson, Pollock, Kaplan & Law, 2000) for children 5 to 15 years consists of six selected items (similar to those in Ayers Clinical Observations) testing component skills including slow movements, rapid forearm rotation, finger/nose touching, prone extension posture, Asymmetric Tonic Neck Reflex, and supine flexion posture. The COMPS is a descriptive screening tool with standardised administration procedures and objective criteria for scoring responses. Due to the small sample size for the age-related weighted scores, the authors recommend caution in interpreting these scores and recommend that COMPS be used in conjunction with a reliable functional performance measure. They stress that functional performance should be the primary indicator for identification and intervention. This instrument has limited utility for students with disabilities in an education context.

**Observations Based on Sensory Integration Theory** (Blanche, 2002) includes videos and a workbook providing step-by-step guidelines for specific observations that include those originally defined by Dr A.J. Ayres as “clinical observations”. The non-standardised tool is intended to be used in conjunction with standardised assessment tools, however, the procedures have not been validated, the data yielded is subjective, and has limited application to an educational context.

While questionnaires are an accepted and efficient method of collecting information about a construct such as sensory processing, they are reliant on the subjective assessment of the respondent. As such, the therapists need to be conscious of possible reporter bias such as an over-focus on symptoms and barriers.

**Informal Sensory Checklists** An increasing range of informal tools and checklists are being published in books, programming guides, and on the internet, for example, *Sensory Checklists from Raising a Sensory Smart Child* (Biel & Peske, 2005). Where no formal measure is determined as appropriate for the specific student or situation, school-based occupational therapists may use these checklists to guide observations, interview with team members and further evaluation.

**Environmental Observational Assessments** As indicated in *Section 2: Practice Principle: Considered Selection of Tools to Examine Sensory Processing*, comprehensive assessment requires evaluation of the sensory features and factors of the environment in which the student is expected to function. A range of informal instruments are available to assist with consistent and repeatable recording of contextual data, including:

- **Observation of School Environment** (Hanft & Shepard, 2008).
- **Checklist for Assessing Environmental Demands** (Janzen & Janzen, 1996).
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- Sensory Components of Task Performance (Dunn, 1991).
- Sensory Rating Scale for the Classroom Environment (Ashburner, 2002).
- Questions to Guide Classroom Observations (Kientz & Miller, 1999).

Some adaptations to existing tools may be beneficial to assist teams to focus upon, evaluate and/or audit specifically the sensory characteristics of the school environment. (See example Appendix 7: Observation of Sensory Characteristics of the School Environment).

Considered Selection Tools to Examine Sensory Processing - Key Message:

Broad acceptance and utilisation within the profession of a particular assessment tool does not necessarily equate with the integrity of the instrument nor that of the underlying theoretical model. School-based occupational therapists have a responsibility to be familiar with the features of the available tools, then select and administer the best possible instrument available at the time for the specific purpose.

Standardised instrumentation should be used in preference to informal tools, checklists or non-standardised instruments wherever applicable. Where formal tools are unavailable, instruments with consistent and repeatable recording means should be utilised.

Practice Principle: Inclusion of functional assessment of behaviours

Several studies have demonstrated that interventions based on results of comprehensive functional assessment have significantly higher probability of being effective than those based solely on other forms of assessment such as standardised testing, unstructured interview, and anecdotal observation (Roberts, 2003).

Therefore, thorough examination of specific behaviours and their relationship to sensory functioning is indicated. In addition, the use of preference and motivation assessments can yield valuable information regarding sensory processing, preferences and behavioural expressions.

Many of the resources available to occupational therapists to assist data collection and planning have originated from an Applied Behavioural Analysis perspective. When conducted by a therapist with a thorough understanding of task analysis and the sensory systems, these can be useful tools in determining which elements of the sensory world may be present as antecedents, motivators or consequences for the student with sensory processing challenges.

Functional behavioural analysis involves accurate description of the target behaviour and subsequent collection of direct observational data. Aims include identification of events, times, or situations which may be predictive of the behaviour, identification of consequences that maintain the behaviour and identification of the motivating function of the behaviour.

Increasingly authors are making more explicit the sensory elements of behaviour analysis. Tomcheck (2001) stated an applied sensory analysis should be used by the therapist to examine the sensory antecedents and consequences both long and short term for adaptive and maladaptive
behaviours. He asserts that the hypotheses should be formulated in accordance with this data and then tested throughout the assessment cycle. This is an important phase in the cycle to avoid mal-attribution or misinterpretation of behavioural expressions.

Functional behaviour analysis may include:
- Duration/frequency charts.
- Data samples.
- ABC Incident Analysis.
- Behaviour Pathways.

Preference, interest and motivation tool examples include:
- Preferences for Activities for Children (PAC) (King et al., 2005).
- Pediatric Interest Profiles (Henry, 2000).
- Paediatric Volitional Questionnaire (PVQ) (Basu, Anna Kafkes, Geist & Kielhofner, 2002).
- Durrand Motivation Assessment Scale (Durrand & Crimmons, 1992).

Determining the role of sensory processing issues in complex and challenging behaviours, may necessitate a more comprehensive functional behavioural analysis to develop hypotheses and assist the team in establishing an understanding of the purpose of the behaviour (Horner & Carr, 1997). Tools to assist an in-depth or systematic analysis by the team include:
- Functional Assessment and Intervention System (FAIS) is designed to identify the function of a challenging behaviour and the contextual factors associated with it. A framework for the development of behavioural interventions, monitoring of progress and evaluation of outcomes is also provided.
- Some functional behaviour assessment forms may be downloaded from the website: http://www.polyxo.com/. These include an observation form, and a behavioural intensity rating scale to quickly document observations of behaviours and a functional behaviour assessment sheet to assess the function that the behaviour serves for the child. This set of worksheets is designed to examine a single behaviour (or type of behaviour), form a hypothesis about the function of that behaviour for the child and design a behavioural intervention plan to address it.

Inclusion of Functional Assessment of Behaviours - Key Message:
Evidence indicates interventions based on results of comprehensive functional assessment have significantly higher probability of being effective. **Thorough examination of specific behaviours and their relationship to sensory functioning is indicated.**

An applied ‘sensory analysis’ **examining the sensory antecedents and consequences**, both long and short term for adaptive and maladaptive behaviours is recommended.
Summary: Assessment and Outcomes Evaluation

Where sensory processing challenges are indicated or suspected, school-based occupational therapists have a responsibility to assess sensory processing within the context of the school environment, using a student-centred, top-down assessment strategy.

Therapists must employ skilled environmental observations and interview techniques prior to considering more formal assessments. Explicit functional goals need to be established at the outset of the process. Selection and administration of a functional outcome measure should precede completion of sensory-specific instruments. This is of paramount importance in a field fraught with uncertain and contradictory evidence for the intervention strategies that may follow evaluation. In the absence of scientific evidence in this domain of practice, outcome measurement must be embedded in daily practice.

Careful consideration and assessment of possible contributors to the behavioural presentation and needs identified (e.g. social-communication and executive function) may be required to provide a comprehensive evaluation of the student’s strengths and needs versus a detailed but potentially narrow evaluation of sensory processing.

Selection from the range of available standardised tools should occur prior to considering non-standardised options. Sensory assessments form only part of an assessment strategy and are never to be interpreted in isolation.

Selected intervention/s should be monitored and their effects on specific goals empirically assessed. They should be discontinued if there is no evidence of effectiveness and be integrated with other (proven) interventions (Perry & Condillac, 2003).

High quality assessment and collaborative practices will support team understanding. This will result in well-informed recommendations for intervention and curriculum planning and support the student’s achievement in their unique school context. Ultimately the outcome of assessment should be an in-depth understanding of the student’s participation in occupations meaningful to him/her and the team (Stewart, 2005).

The five practice principles for assessment presented in this document are designed to support development of a best practice evaluation strategy for school-based occupational therapists working with students with sensory processing challenges. An action guideline illustrates a staged process in devising a top-down assessment with explicit identification of goals and outcomes, through to ensuring multiple data sources, careful selection of sensory assessment tools and ensuring comprehensive functional assessment of presenting behaviours.
There is, without doubt, a lack of empirical evidence for the validity of many of the approaches used in paediatric occupational therapy for treatment of children with sensory processing challenges. This is despite claims made by the exponents of some programs and apparent widespread acceptance by some in the profession. Some approaches may show promise but are yet to be substantiated as effective, subject to the rigors of good science (Roberts, 2003). Methodological challenges continue to impact the fidelity of published research in this field. Unfortunately there is a tendency for research containing significant errors in interpretations of the evidence to be used to substantiate claims for particular interventions.

A lack of research evidence does not necessarily mean an approach is invalid or ineffective, or that future research will not provide better evidence. A particular intervention even if unproven may be appropriate to trial with a particular individual. This could be warranted when there are specific symptoms or functional difficulties, preferences and circumstances present. Trials should only be done when accompanied by careful clinical reasoning and communication about the lack of established evidence. Even when a ‘treatment’ has been established as effective, it may require more investigation to extend favourable outcomes to broader age or diagnostic group or to skills and behaviours targeted for improvement.

Sensory processing is currently a strong focus of occupational therapy publications, organisations and marketing. An increasing range of sensory ‘gadgetry’, ‘recipes’ and ‘training’ is being promoted both within and outside the profession. Support from influential professional bodies, respected educational institutions and well-known authors, along with persuasive marketing for certain ‘specialised’ approaches and devices may present the occupational therapy practitioner with a sense of professional dilemma. Departmental occupational therapists need to be aware of these influences and carefully reason interventions for sensory processing within an occupation-centred approach to supporting students’ school participation and success.

Bundy (2002) recognised that school-based occupational therapists are commonly called upon to contribute to the education team’s understanding of the student’s behavioural presentation and performance from a sensory perspective. Miller (2003) asserted a best practice model for a child with sensory processing challenges involves adaptations to home, school and community environments to support function and life satisfaction. DiMatties & Sammons (2003) contended collaboration between the occupational therapist, teacher and parent is best way to support students’ specific sensory needs. Ashburner (2006) reported school-based occupational therapists frequently use sensory strategies to adapt classrooms and curricula to ‘fit’ the individual sensory processing attributes of the student.
Practice Principle: Interventions from the Top of the Continuum First

To achieve a best practice framework, key considerations for occupational therapists when determining ‘interventions’ for sensory processing issues, include the social and ecological validity of the approach, as well as the available evidence for the approach (Ashburner, 2009). Like other therapy interventions, sensory-based interventions have the potential for inadvertent negative impacts, such as compromised instructional time, schedule disruption, social segregation or stigmatisation (Hinder & Ashburner, 2010). Specific concerns about the social stigma associated with particular sensory interventions implemented in school settings have been raised (Segal & Beyer, 2006). Educators such as Giangreco (2000) have long advocated that therapy services and supports are only as specialised as is necessary, in order to minimise collateral effects such as social stigmatisation, segregation and/or disruption to educational programs.

A continuum detailed in Figure 8 (and summarised in a graphic pyramid in Figure 9) is proposed as a framework to guide therapeutic reasoning in selection of interventions to support sensory processing and student success.

Occupational therapists are encouraged to consider the less intrusive and intensive interventions at the top of the hierarchy which are more inclusive in the first. This should be done before resorting to the options at the lower end of the hierarchy. These are more intensive, intrusive and poorly supported by evidence. Muhlenhaupt (2006 cited in Rodger & Ziviani 2006) recommends a continuum of intervention options to support a child’s educational program. She advocates for therapists to consider the first option and add only as many interventions as necessary to enable student participation. As the intervention categories are not mutually exclusive and there may be many issues unique to the individual to consider, this framework is intended as a guide, rather than a strict protocol.

When a team or some team members wish to pursue a particular intervention method that is poorly supported by evidence, departmental occupational therapists should only consider being involved in a trial if other options with more established efficacy have been exhausted. It is essential for the therapist to discuss the current lack of evidence in these instances. In addition they should establish agreed processes for systematically and continually monitoring and measuring intended or unintended outcomes of the intervention (Leong & Carter, 2008; Baranek, 2002).
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### 1. Information sharing and mutual problem solving of sensory processing issues

**Examples:**
- Information
- Education about sensory processing
- Mutual problem solving with the education team including student, family members and key education personnel

### 2. Use of universal design principles for sensory aspects of tasks and/or environments

**Examples:**
- Strategies to improve classroom acoustics (e.g. carpets and furnishings to dampen noise)
- Amplification of the teacher’s voice
- Reduction of excessive visual clutter
- Increasing salience of important input (e.g. key points of lesson or visual schedule)

### 3. Adjustments to tasks and/or environments to cater for individual needs

**Examples:**
- Re-arrangement of classroom furniture to reduce extraneous tactile and auditory stimuli
- Quiet study carrel for focused work
- Safe havens from overwhelming stimuli (e.g. quiet corner of classroom, school library)
- Increased use of visual cues as an adjunct to oral instruction
- Graphic organisers for homework tasks

### 4. Sensory input to modulate arousal

**Examples:**
- Exercise or frequent movement breaks
- Seating on therapy balls or unstable cushions
- Weighted products
- Earphones/ ipod with music

### 5. Cognitive self-regulation strategies

**Examples:**
- Alert Program (Williams & Shellenberger, 1996)
- Sensory Stories (Marr & Knackley, 2003)

### 6. Desensitisation or expanding tolerance to aversive sensory input

**Examples:**
- Graduated exposure
- Modeling and support
- Behaviour modification techniques (e.g. differential reinforcement and escape extinction)

### 7. Interventions that aim to improve the efficiency of sensory processing

**Examples:**
- Sensory Integration Therapy (Ayres, 1979)
- Therapressure Protocol (Wilbarger & Wilbarger, 1991)
- Therapeutic Listening (Frick & Hacker, 2001)

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**Figure 8: Clinical reasoning continuum for selection of sensory interventions**

(Adapted from: Ashburner, 2009)
First and foremost options for intervention should be negotiated collaboratively with the student, family and other education team members. Interventions are more likely to be implemented if the team has arrived at a shared understanding of the sensory processing issues and the goals of the interventions and has developed mutually owned solutions.

1. Case-Smith (1997) contested understanding a student’s sensory processing abilities is important to developing occupational performance in the school setting, however, enabling this understanding in the student and education team is equally important. Cahill (2003) indicated it is fundamental to collaborate with and empower the class teacher involved in supporting the student. The greater the understanding of sensory processing the teacher and education team members hold, the more receptive they will be to making adjustments, changing practices, problem-solving and implementing recommendations (Parham & Mailoux, 2005). Therefore, mutual information sharing and problem solving is the starting point in the intervention continuum hierarchy. Dunn (2001) refers to sharing ‘the gift’ of the occupational therapy profession’s sensory processing knowledge as a powerful means to address the individual’s sensory processing challenges and life goals. Departmental occupational therapists report that sometimes this stage of intervention alone is sufficient to achieve the desired outcomes for the student, and further progression through the continuum is not needed. Best practice occupational therapy services at school may include:

- provision of resources and information for students, teachers and families about sensory processing, sensory preferences and functional significance in school participation
- assistance for the education team in early recognition of key behaviours related to sensory events, an environmental audit and general strategies to reduce or enhance sensory events in the school day
- contribution of information and strategies about sensory styles into the student’s education program (e.g. positive behaviour support plan; social skills group).

There is an increasing range of tools on the market that contain education materials and professional development regarding sensory processing for education teams and the wider community (See Appendix 9: Resource Ideas to Consider).

2. Fundamental to supporting student success is the application of universal design for learning (UDL) principles (Rose & Meyer, 2006) and considering sensory aspects of school environments, curriculum tasks and instructional methods. Information sharing, education and problem-solving at a systems level may be an effective enabler of UDL (e.g. all staff in-service about sensory properties of learning environments). Ideally, these considerations occur during the planning and design phases to enable sensory environments that are broadly accessible and inclusive of a diverse range of learners. However, in reality, many school buildings were constructed prior to or without consideration of the sensory factors that are influential in learning environments. Departmental occupational therapists report that schools often need support to retrofit or adjust learning environments when challenges become apparent in the mismatch between environment/s and students’ sensory processing styles. For example, it is well recognised that students hear and learn more effectively in classrooms with suitable acoustics, where the teacher’s voice is amplified if necessary and extraneous information is minimised (Massie, 2004; Ashburner, 2009). Strategies such as funding or acquiring of additional resources (e.g. for sound-field amplification equipment or noise dampening soft furnishings) and making changes to school routines and practice (e.g. changing staggered lunch times to reduce playground noise during lessons) may be responses that the school community should consider first. ‘Popular’ but unproven interventions (e.g. ‘auditory or listening programs’) or the prolonged interim use of equipment and modifications (e.g. ear plugs, muffs or ipods™) may seem more immediately achievable in these situations. However,
the risk associated with these ‘quick fixes’ is that they can promote a deficit focus for individual students, rather than addressing the barriers inherent in the learning environment. Awareness raising, advocacy and collaborative planning for UDL are important roles for occupational therapists in the inclusive education context, and should precede application of less inclusive, less evidence-informed and more restrictive intervention techniques.

3. Adjustments to school tasks and/or environments may be indicated in order to cater more effectively for the unique sensory style and learning needs of the student. Dunn (in Strzelecki, 2008) cites the growing interdisciplinary evidence indicating provision of intervention within everyday routines (such as schooling) leads to stronger and more generalised participation in children. It can also lead to more competence in support from key stakeholders including teachers. Best practice involves working collaboratively to devise adjustments to curriculum tasks, classroom or playground environments and instructional methodologies that respond to the specific sensory needs and preferences of the student. These interventions involve selection and design of activities and environments to suit the sensory processing patterns of the individual student. This improves the match been the student, the environment and the activity or occupation. Strategies that aim to accommodate rather than fix atypical patterns of sensory processing have been advocated strongly by Dunn (2001). This is consistent with a student-centred, occupation-focussed approach to intervention in inclusive school contexts for students with disabilities.

Findings from a systematic review by Case-Smith & Arbesman (2008) support proactive processes for modifying classroom environments to support student arousal and sensory processing. Some examples of this approach include reducing exposure to aversive sensory input (e.g. rearrangement of classroom furniture to reduce extraneous touch and auditory stimuli); providing avenues of appropriate escape if aversive input becomes unavoidable and overwhelming (e.g. a safe haven within a classroom) (Ashburner, 2009) or structured teaching strategies for increasing the saliency of key sensory input (e.g. using visual cues) (Quill, 1994) to meet the learning preferences and strengths of the individual student.

4. Sensory input to modulate arousal may be indicated using specific sensory strategies to modulate a student’s level of arousal, attention, affect and regulation for learning (Royeen & Lane, 1991). As the impact of these inputs are transient, sensory strategies are intended to be embedded within the student’s school routine at appropriate times, to enable performance of specific functional tasks. The aim of sensory modulation strategies is to accommodate rather than fix atypical patterns of sensory processing (Dunn, 2001). Dunn (2001) advocated selection and design of activities and environments to suit the sensory processing patterns of the individual and thereby improve the match been the student the environment and the activity or occupation. Evidence to support some of the specific strategies (e.g. dynamic seating options; weighted products; fidget objects) is currently limited (See Section 1: Evidence Review). Many professionals working with children within and outside the occupational therapy profession have identified that physical activities have calming and organising effects on modulation and attention. These activities may involve proprioception/deep pressure, cited as “mapping discriminative stimuli” (Dunn, 1997), regular movement breaks as well as physical exercise (Lang et al, 2010). These strategies may be more readily embedded in typical school activities including playground, Smart Moves and physical education classes, workstation rotations and transits between classrooms and work areas. In addition to these strategies, sensory input to modulate arousal frequently involves provision of specialised equipment (e.g. earplugs, weighted vests). Departmental occupational therapists need to carefully consider potential risks in application of these devices and ensure these are appropriately managed (See Practice Principle: Identify and Manage Risk, p.49).
5. **Cognitive self-regulation programs** are generally designed to build the student's and team's awareness and knowledge of sensory strategies that can be applied in everyday situations. The Alert Program® (Williams & Shellenberger, 1996) aims to support students, teachers and other education team members to select appropriate strategies to change or maintain states of individual alertness (See Section 1: Evidence Review). Sensory Stories® (Marr & Knackley, 2003) use line drawings to depict activity sequences of calming sensory strategies to use when a student may be challenged by an aversive sensory event. Awareness-raising and cognitive approaches (such as problem solving and guided discovery) are encouraged during Stage 1 on the continuum when engaging in mutual information sharing and problem solving. However these Stage 5 programs for cognitive self-regulation refer to those interventions that require intensive or prescriptive application of techniques, development of specific resources and running groups in accordance with specified procedures.

6. **Desensitisation or expanding tolerance to aversive sensory input** may be appropriate in instances where extreme sensory sensitivity interferes with the student's capacity to perform essential life tasks (Ashburner, 2009). It needs to be recognised that some students develop particular phobias to very specific types of sensory input. Specific approaches including graduated exposure, modelling and behaviour modification techniques may be applied to ‘desensitise’ or expand a student's tolerance of the specific sensory input. For example, one study illustrated success in increasing the tolerance of children with autism to skin care products through graduated exposure, modelling and social attention (Ellis, Ala'i-Roslaes, Glenn, Roslaes-Ruiz and Greenspoon, 2006). Another study demonstrated reduced hypersensitivity to certain foods through graduated exposure to new foods and texture manipulation, in combination with traditional behaviour modification techniques (Ledford & Gast, 2006). Steigler & Davis (2010) examined sound aversion in individuals with ASD and reviewed intervention practices to assist desensitisation to aversive stimuli and support self-regulation. Ashburner (2009) suggested it is possible that graduated exposure increases the predictability of some sensory experiences thereby reducing the fear associated with these experiences for particular for students with autism spectrum disorder. These approaches should be considered where appropriate. Teams need to recognise the need for them to be highly individualised, supported by assessment, design, implementation and monitoring from personnel with a psychology background and/or strong behavioural expertise. They are designed to address a particular ‘problem’ behaviour that is compromising a student’s wellbeing or success in a particular situation and are not intended to generalise to other domains of sensory processing.

7. **Interventions that aim to improve the efficiency with which the nervous system processes sensory input** include those such as Ayres Sensory Integration®, specific Therapressure protocols and 'sound' or auditory-Based therapies (See Section 1: Evidence Review). There is currently little evidence to support the notion that the way that the nervous system processes sensory stimuli can be fundamentally changed (as distinct from the transient effects of sensory input or desensitisation to specific stimuli). Further research is required to validate these approaches (Ashburner, 2009). Occupational therapists have been widely criticised by other professionals for using intensive sensory interventions because of lack of empirical support. These intensive interventions can also take time away from other potentially beneficial interventions with superior empirical support (Ashburner, 2009; Rodger, 2009).
Education teams have a responsibility to ensure appropriate processes identify, minimise and mitigate risks inherent in learning tasks and environments in accordance with departmental policy HLS-PR-012: Curriculum Activity Risk Management. It is acknowledged many worthwhile activities entail situations, materials or events that involve a controlled element of risk. Occupational therapists play a role in advocating and supporting education teams to understand the importance of ‘risk’ for students with disabilities and collaborate in a systematic approach of identifying hazards, managing risks and reviewing learning activities for students receiving their services. The procedures associated with this policy enable planning, approval and implementation of potentially hazardous learning activities in a manner that reduces and manages the risk of illness or injury to staff and students.

A number of sensory approaches involve use of specific equipment or devices. It is essential that departmental occupational therapists recommend or apply only those products that are commercially available and which are designed for the intended application, ensuring legal liability
for the product rests with the manufacturer. It is important that occupational therapists ensure teams have access to and knowledge of the instructions for appropriate care and usage, are aware of relevant contraindications, repair and replacement schedules and recommended procedures for monitoring or supervision. In addition, the potential risks of inappropriate use by the student or others must be identified and managed.

Guidelines regarding specific devices or equipment are detailed below.

**Weighted or Compressive Products**

A range of inherent risks in the application of weighted or compressive products have been identified. These require careful consideration by education teams.

The risk associated with inappropriate application of weighted blankets was documented in Canada in 2008 after the death of a child (see Evidence Review: Weighted or Compressive Products, p18). The coroner presented “Because the therapeutic value of weight blankets does not seem to be proven scientifically, and because of the fact that they pose a risk for children’s lives, we could be tempted to prohibit their use altogether. However, I believe that it is possible to manage usage in a strict manner in order to minimize the danger. I believe that certain ground rules must be respected by those who wish to use this sensory pressure technique, namely:

- A health professional’s advice must be obtained to ensure that the use of the blanket is suitable for the child;
- The weight of the blanket must be in proportion of the child’s physique and weight;
- The child’s head must never be, or be able to be, covered by the blanket;
- Vital signs should always be observable;
- The child must never be rolled in a blanket (unless a therapist is constantly at his or her side);
- A child must never be left unsupervised;
- The child must be able to easily slip out of the blanket if he or she wishes to do so (it is not a confinement);
- The child must express his or her consent to this, even if it is not verbal.”

It is essential for education teams to exercise due diligence and implement risk management strategies consistent with those recommended by the Quebec Coroner’s Office. Establishing rigorous, individualised implementation and monitoring procedures are critical if these products are to be trialed in the school context.

Departmental occupational therapists have a responsibility to ensure education teams choosing to use a weighted blanket (or similar product posing any risk of suffocation) are aware of this report and recommendations. They should collaborate with school administration and family members regarding appropriate protocols for implementation and monitoring. Currently there is insufficient evidence and varying protocols available to guide the application of weighted and/or compressive products. In addition there is a potential risk of negative biomechanical stress on growing bodies associated with their use. Consultation with others such as the team physiotherapist or the student’s doctor is recommended prior to consideration of a trial of these products.
Alternate Seating

Caution should be exercised when prescribing any alternate or dynamic seating option to support sensory processing. Consideration must be given to the potential risks to physical function or development such as fatigue, musculoskeletal contraindications or postural compromise. In addition, the student and staff must have access to information about appropriate, safe use. Any risks of inappropriate use (e.g. by peers) must also be considered.

Consultation with the team physiotherapist is recommended prior to considering a practice trial with alternate seating products for students with disabilities.

Fiddle or Fidget Toys

Items marketed and used for ‘fidgeting’ vary widely in product quality, safety and durability. Consideration of whether items could be broken, leak, ingested or present a choking hazard should take place before recommendation. In addition, discussion about whether they would cause a distraction in the classroom is also necessary. Students and staff must have access to information about appropriate, safe and hygienic use of these items.

Oral Programs for Sensory Processing and Chewing Products

Close collaboration with the speech-language pathologist is recommended if the education team is considering any interventions of an oral-motor nature. Risks of ingestion of non-edible items, choking, dental damage or unknown impacts on developing oral-motor structures require careful consideration.

Practitioners need to be aware that some products that are commercially available and marketed for oral-sensory applications (e.g. Thera-Band-Tubing® for resistive exercise) were in fact not originally designed for this application and may present unacceptable risk for some students). Therefore, departmental occupational therapists need to select and prescribe only those devices or materials expressly designed for the intended application to provide oral sensory stimulation (e.g. Chewy Tubes®, ‘ARK Grabbers’, ‘Beckman Tri-Chews’ or ‘Chewelry’).

In addition hygiene and infection control must be thoroughly considered in accordance with departmental risk management and health and safety policies and guidelines.

Summary: Intervention Approaches/Programs for Students with Sensory Processing Challenges

Occupational therapy supports and interventions need to be designed to achieve outcomes that are meaningful to the student and his/her team. Any intervention needs to be monitored and altered in accordance with responses of the individual student and/or their classmates. Therefore, outcome measurement must be embedded in daily practice. (See Assessment and Outcome Evaluation, p28).
The decision-making regarding intervention options occurs as part of occupational therapy clinical reasoning process. It needs to focus at the outset on evidence-informed, socially valid, inclusive and unobtrusive intervention options that minimise risk and educational disruption. A continuum to support sound decision-making in intervention selection is provided in these guidelines (see Fig 8, Clinical Reasoning Continuum for selection of sensory interventions, p. 45). Departmental occupational therapists should only consider being involved in trialling an approach at the lower end of the continuum in circumstances where all other options with more established efficacy have been exhausted.

The potential risks associated with application of particular sensory approaches and equipment must be diligently identified and proactively managed in collaboration with the education team.

A systematic approach is required to ensure quality occupational therapy service provision from the outset for students with sensory processing challenges. Each of the underpinning practice principles which have been detailed above are summarised graphically in Figure 10.
Directions for Future Research

These Guidelines and the related literature review serve to highlight the paucity of available research evidence and the need for occupational therapists to embed ongoing inquiry within daily practice, as new findings are becoming available with regularity at the time of publication.

There is an undeniable need for large-scale, more carefully constructed and controlled research in the field, including repetition of existing studies to determine applicability across ages, diagnoses, cultures, settings and environments, and to explore and exclude a range of other influencing factors for the individual or cohort, such as behaviour or attention factors. However, individual therapists can make a significant contribution by systematically evaluating in context their own work with students with sensory processing challenges and ensuring thorough data collection.

Robust use of individual outcome measures and increased use of single-subject research designs (e.g. multiple baseline) are optimal for tracking intervention effectiveness for approaches that have not been rigorously tested, and are accessible methodologies for school-based practitioners.

Summary: Occupational Therapy Best Practice with Students with Sensory Processing Challenges

The breadth and diversity of occupational therapy practice in this field provides fertile ground for controversy especially while much of the evidence available is inconclusive. Advocates for particular approaches argue as fervently as critics. While this may present a dilemma for practitioners who feel conflicted, others are spurred with determination. The determination to be curious, critical and energised practitioners who engage in ongoing investigative inquiry in the field of occupational therapy for people with sensory processing challenges.

Decision-making in paediatric occupational therapy is complex and multi-faceted, frequently requiring consideration of alternatives and dealing with uncertainties (Copley, Bennett & Turpin, 2010). Useful and trustworthy information is not always available to support decision-making. The likelihood of dealing with unexpected situations or outcomes should be an expectation of occupational therapy practice (Copley, Bennett & Turpin, 2010).

Information from empirical research is only one facet of information considered when making practice decisions (Copley, Bennett & Turpin, 2010). In the absence of scientifically rigorous evidence, occupational therapy practitioners have a professional responsibility to consider broader information to make decisions. Knowledge of the student and team, departmental and school contexts (including available resources) and their own professional knowledge and experience must be drawn upon and integrated for effective decision-making in practice. School-based occupational therapists can build practice–based evidence and use accessible methods of research in practice (e.g. action-based; single-case studies; single-case series; pre-post-test design studies). Regular reflection on practice is essential. Each new student and practice question encountered requires integration of experience-based knowledge with continued evidence-inquiry.
These guidelines aim to offer a framework for departmental occupational therapists to navigate practice decisions in providing quality services to students who experience sensory processing challenges.

*Note: Best Practice Guidelines need to evolve, be updated and modified to be relevant with the development of scientific literature, outcome research, new intervention strategies and changes in the practice context. Regular revision and timely updates are a necessary part of the process.*
Section 3: REFERENCES


Bagatell, N., Mirigliani, G., Patterson, C., Reyes, Y. & Test, L. (2010). Effectiveness of Therapy Ball Chairs on Classroom Participation in Children With Autism Spectrum Disorders, The American Journal of Occupational Therapy, 64 (6), 895-903


Functional behaviour assessment forms may be downloaded from the website: http://www.polyxo.com/


Best Practice Guidelines for Department of Education and Training Occupational Therapists:  
 Supporting Students with Sensory Processing Challenges


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SECTION 4: APPENDICES

Please Note:
Compilation of an ‘Appendices Wishlist’ has commenced to complement the materials contained in these Guidelines and these Appendices. Priorities identified include:

⇒ presentation templates and notes for in-service/team education regarding supporting students with sensory processing challenges
⇒ expanded ideas for influencing Universal Design for Learning and whole-school considerations of sensory characteristics of learning tasks and environments
⇒ Occupational therapy report templates for students with significant sensory processing challenges
⇒ templates/protocols for trialling specific sensory interventions
⇒ data collection tools for monitoring and evaluating specific sensory interventions
⇒ reviews/critiques of available sensory resources (books, programs, DVDs)
⇒ supplier contacts for sensory resources (equipment, toys, materials).

Availability of an electronic version of the Guidelines on the Therapy Blackboard Community is intended to enable departmental occupational therapists to access a range of support materials as these are developed or updated over time. All departmental occupational therapists/therapy networks are invited to contribute de-identified templates, case-based examples, program exemplars, report formats, evidence reviews, resources, references, presentation outlines etc, in order to add to the available support materials for best practice school-based occupational therapy for students with sensory processing challenges. The Department of Education and Training (DET) Sensory Processing Special Interest Group may have some capacity to use the guidelines to develop and/or review such materials. Contributions, as well as ideas for further inclusions in the Appendices may be made by contacting a member of the Occupational Therapy Team at Disability Services Support Unit email: DisabilityServicesSupportUnit@deta.qld.gov.au.

Appendix 1: Membership of the Best Practice Guidelines for Department of Education and Training Occupational Therapists Project Team

The project was overseen by project leader Jackie Spillane, DET Principal Advisor – Occupational Therapy and managed by Liz Hinder, DET Senior Advisor – Occupational Therapy. Working group members included DET occupational therapists Kylie Brown, Lee Bull, Deborah Busch, Jenny Do, Liz Hinder, Kerry Hos, Aneesa Kathrada, Bronwyn Kearney, Anita Lloyd-Jones, Ellena McDonald, Emma O’Connor, Yogi Pillay, and Katie Robinson.

Co-collaborators to the project included occupational therapy members of the DET Sensory Processing Interest Group; DET occupational therapists, networks and education teams in schools; Occupational Therapy Advisers (Disability Services Support Unit), Senior Occupational Therapists and professional supervisors in occupational therapy in the department.

In addition, consultation was conducted with interagency and independent partners in occupational therapy provision for children and young people with disabilities. Expert practitioners and researchers in the profession of occupational therapy from a range of organisations were consulted, with particular support received from Dr Jill Ashburner, Autism Queensland and Professor Sylvia Rodger, University of Queensland.
Considerations for Selection and Application of Interventions for Sensory Processing Challenges:

**THE 60 SECOND CHECKLIST**

Is the practice:

- Occupation-centred? √ x
- Inclusive? √ x
- Socially-valid? √ x
- Theoretically congruent? √ x
- Scientifically sound? √ x
- Evidence-informed? √ x
- Safe? √ x
- Respectful? √ x
- Educationally relevant? √ x
- Conducted correctly? √ x

This 60 Second Checklist may be useful when considering options for selection and application of interventions in practice, when viewing practices in schools or classrooms, or when reviewing and practices promoted or showcased in other forums, such as the internet.

The *YouTube* clips below are examples of materials depicting occupational therapy practices or endorsements on the world-wide web. The 60 Second Checklist may be used for teams to reflect upon how the intervention depicted aligns with occupational therapy best practice principles for supporting students with sensory processing challenges.

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**Freeze Frame**

OT Sensory Brush [http://www.youtube.com/watch?v=E3-YMHKmflg&feature=related](http://www.youtube.com/watch?v=E3-YMHKmflg&feature=related)

Sensory Integration - "Marshmallow" air mattress [http://www.youtube.com/watch?v=4dQlQwmdq4w](http://www.youtube.com/watch?v=4dQlQwmdq4w)

Handling a Meltdown (1:57) [http://www.youtube.com/watch?v=IP_13ybE5vY](http://www.youtube.com/watch?v=IP_13ybE5vY)

Joint Compressions - "Squishies" - After a Meltdown [http://www.youtube.com/watch?v=HgY8vNhR3o&feature=PlayList&p=F99264CDD005B8E2&playnext=1&playnext_from=PL&index=1](http://www.youtube.com/watch?v=HgY8vNhR3o&feature=PlayList&p=F99264CDD005B8E2&playnext=1&playnext_from=PL&index=1)

Big Hug - Sensory Therapy, Deep Pressure Positioning Aid [http://www.youtube.com/watch?v=2hkyoYBTc8c](http://www.youtube.com/watch?v=2hkyoYBTc8c)

Miracle Belt & Sensory Belt help Children with Sensory Needs [http://www.youtube.com/watch?v=GlNvYukPjks](http://www.youtube.com/watch?v=GlNvYukPjks)

Occupational Therapy: OT in the School [http://www.youtube.com/watch?v=k7GEm50sClM](http://www.youtube.com/watch?v=k7GEm50sClM)
## Reflection on Occupational Therapy Practice:
Supporting Students with Sensory Processing Challenges

<table>
<thead>
<tr>
<th>OT:</th>
<th>Date:</th>
</tr>
</thead>
</table>

### Concerns identified on Request for Service:

- How did I determine sensory processing as an issue impacting the student’s education?
- What assessment strategy and methods did I use?
- What was my clinical reasoning behind the assessment strategy I developed?
- What did I use to guide or inform interpretation and reporting?
- What sensory intervention/s, curriculum adjustments or training did I implement?
- What was my clinical reasoning behind the strategies implemented?
- Was my intervention successful or not, and how do I know?
<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>What went well?</td>
<td></td>
</tr>
<tr>
<td>What didn't go well?</td>
<td></td>
</tr>
<tr>
<td>What knowledge informed my practice in this situation?</td>
<td></td>
</tr>
<tr>
<td>What knowledge could have informed my practice in this situation?</td>
<td></td>
</tr>
<tr>
<td>What are my feelings about my practice with this student/team?</td>
<td></td>
</tr>
<tr>
<td>What did I learn from the situation?</td>
<td></td>
</tr>
<tr>
<td>How will my learnings from this student/team influence my work with other students/teams in future?</td>
<td></td>
</tr>
<tr>
<td>How might I share my learnings to build the body of available professional knowledge?</td>
<td></td>
</tr>
<tr>
<td>What else do I need to know or need to action?</td>
<td></td>
</tr>
</tbody>
</table>

*Adapted from: Gibbs (1988) Structured Reflective Practice Tool*
# Sensory Processing: Resource Appraisal Checklist

<table>
<thead>
<tr>
<th>NAME OF RESOURCE:</th>
</tr>
</thead>
<tbody>
<tr>
<td>OBJECTIVE/PURPOSE OF RESOURCE:</td>
</tr>
<tr>
<td>(e.g. rationale/intent for program/recommendations/resource)</td>
</tr>
<tr>
<td>TARGET AUDIENCE/SERVICE RECIPIENT:</td>
</tr>
<tr>
<td>FORMAT/LAYOUT:</td>
</tr>
<tr>
<td>DESCRIPTION OF RESOURCE:</td>
</tr>
<tr>
<td>IMPLEMENTATION GUIDELINES: (e.g. materials/time/environment recommended)</td>
</tr>
<tr>
<td>CONTRAINDICATIONS OR PRECAUTIONS:</td>
</tr>
<tr>
<td>EVIDENCE: (e.g. references; evidence summary)</td>
</tr>
<tr>
<td>POSSIBLE APPLICATION/S: (e.g. alternate uses)</td>
</tr>
<tr>
<td>MONITORING OR REVIEW INFORMATION: (e.g. timeframe; contact details for therapist for queries; outcome measurement or monitoring strategies)</td>
</tr>
<tr>
<td>SUGGESTIONS FOR FUTURE DEVELOPMENT OR PRACTICE IMPLEMENTATION:</td>
</tr>
</tbody>
</table>
**Observation of Sensory Characteristics of the School Environment**

(Adapted from Worksheet 2.2A: Collaborating for Student Success: A Guide for School-Based Occupational Therapy, Hanft & Shepherd, AOTA, 2008)

<table>
<thead>
<tr>
<th>Sensory Characteristics of Materials or Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tactile/kinesthetic (materials, furniture, carpet):</strong></td>
</tr>
<tr>
<td>• Textures</td>
</tr>
<tr>
<td>• Proximity to others</td>
</tr>
<tr>
<td>• Other features</td>
</tr>
<tr>
<td><strong>Auditory:</strong></td>
</tr>
<tr>
<td>• Noise level in or outside classroom</td>
</tr>
<tr>
<td>• Acoustic features</td>
</tr>
<tr>
<td><strong>Visual:</strong></td>
</tr>
<tr>
<td>• Light source</td>
</tr>
<tr>
<td>• Glare</td>
</tr>
<tr>
<td>• Colour</td>
</tr>
<tr>
<td>• Chalkboard, computer, projection systems, written materials</td>
</tr>
<tr>
<td>• Bulletin boards, visual schedules, decorations</td>
</tr>
<tr>
<td>• Other features</td>
</tr>
<tr>
<td><strong>Movement opportunities:</strong></td>
</tr>
<tr>
<td><strong>Temperature/humidity/ventilation:</strong></td>
</tr>
<tr>
<td><strong>Other:</strong> e.g. odours</td>
</tr>
</tbody>
</table>

**Consider Sensory Implications of Space, Place and Pace**

<table>
<thead>
<tr>
<th>Organisation/arrangement of:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• furniture and space</td>
</tr>
<tr>
<td>• traffic pathways</td>
</tr>
<tr>
<td>• spaces defined for purpose (e.g., academics, social/play area, self-care, independent/cooperative, quiet/active areas)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Routines and Transitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>• beginning the day/class</td>
</tr>
<tr>
<td>• academics (e.g., time of day)</td>
</tr>
<tr>
<td>• time management, organisational strategies</td>
</tr>
<tr>
<td>• transition between activities</td>
</tr>
<tr>
<td>• ending the day/class</td>
</tr>
<tr>
<td>• going to and from classes</td>
</tr>
<tr>
<td>• going to and from different areas of the school</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Temporal features</th>
</tr>
</thead>
<tbody>
<tr>
<td>• sequencing and timing of activities:</td>
</tr>
<tr>
<td>• classroom schedule (structured/unstructured)</td>
</tr>
<tr>
<td>• variety of activities with quiet and active times</td>
</tr>
<tr>
<td>• movement opportunities</td>
</tr>
<tr>
<td>• duration of activities</td>
</tr>
</tbody>
</table>

**Recommendations to discuss with team members** (ways to increase “fit” between the student, the demands of the activity, and the environment):
Example: **Weighted Vest Trial: Student’s Name**

**TRIAL DATES** - ...... to ........

**BACKGROUND TO TRIAL:** (insert relevant info/data influencing OT reasoning/team decision-making, such as Reason for Request for Service, relevant assessment findings)

**WHY WEAR A WEIGHTED VEST?**
Weighted vests may provide the wearer with a consistent and prominent form of input that may help to meet their sensory needs. The weight can give extra feedback to the student’s body about position in space. Some students may also find weight calming. The wearing of a weighted vest may assist a student to participate in an activity for a longer period of time.

**WEARING TIMES:** (as no standard protocols exist, tailor times/schedule considering all student and context information, and the BPSP Guidelines) Offer **The Student** the vest about 15 minutes prior to morning sessions or music classes (or any other sustained sitting time).

**WHAT TO LOOK FOR** (insert target behaviour to be measured/scaled)
- **INCREASE IN TIME SEATED**

**WEARING GUIDELINES**
1. Offer the vest but do not make **The Student** wear it if he doesn’t want to
2. Leave the vest on for as long as **The Student** likes/chooses.
3. Ask **The Student** every ½ hour if he would like to remove it (leaving it unzipped will give him the opportunity to remove it when he wants).
4. If **The Student** removes the vest give him a break of at least an hour.
5. Take the vest off for play times, PE, SmartMoves/gross motor sessions or similar activities.

**PRECAUTIONS**
- Do not allow **The Student** to rest with the vest on or to pull it over their head **at any time**.
- When the vest is put on – check for any biomechanical problems. Is **The Student’s** body straight or is he leaning to one side, is his neck and body in alignment? Report any differences to the OT.
- Remove the vest if **The Student** appears flushed, has rapid breathing or is distressed by the vest.
- Do not wear the vest in very hot weather.
- For care and hygiene of a wheat-filled vest, store overnight in the freezer once every 2-3 weeks.
- Monitor the weighted vest for wear/damage e.g. rips. Discontinue use if damaged.

**DATA COLLECTION**
- Demonstrating that the use of a piece of equipment is successful requires data collection. A Goal Attainment Scale (GAS) goal has been developed to measure the success of the weighted vest (and other strategies) in supporting **The Student** (insert relevant goal/outcome identified) to sit during morning session and music.
- **(insert data gathering & monitoring strategies agreed by the team)** Each week in music time record how long the student is able to sit. If he gets up, start the timer again. Record on the GAS sheet the score correlating to the time (e.g. a -1 for 3 minutes).

If you have any questions or concerns, please see the OT for assistance or clarification.
**Example:**

WEIGHTED BELT : WEARING SCHEDULE TRIAL

TERM : (20...)
CLASS TEACHER : ________________

Student Name : ________________
D.O.B : C.A.:

Diagnosis:
Medication: -

Other Equipment / Therapy / Specialist input : uses a disco-sit cushion in main classroom, has previously trialed ‘theratogs’.

STUDENT’S WEIGHT : kg (Date : )
Miracle Belt Size Used: (see picture) Large (for children 20-34kg)

OCCUPATIONAL THERAPIST :
Tel. : Fax : email :

TRIAL PERIOD : From : _____to______ With Belt OFF for 2 weeks

TRIAL PERIOD : From : _____to______ With Belt ON for 2 weeks.

It is important that sensory strategies are used before a task, to help prepare the student or during a task to help support their participation. They should not be used as a reward after the task, as the opportunity for it to be of benefit from a sensory processing model, will have passed.

The belt weight should not exceed 5% of the student’s weight and should be light enough for the student to be able to remove it independently as desired.

Comment on the behaviour being observed using the chart provided.

* Use a camera to record the 30 minute session each morning, where possible. The camera should be mounted where it can capture the student’s behaviour clearly.

* A stopwatch will be needed to record maximum time seated.

**Rationale for Using the Weighted Belt :**
The belt is being used to provide sensory input (namely proprioceptive input ) through deep pressure, that is considered both calming and alerting. The belt is to be used during:

- **Morning session for 30 minutes from ____ am to ____ am**

to help the student regulate the following behaviour :

- **In seat behaviour**
and the following specific behaviour :
**Record of Usage of Weighted Belt : Form 1**

Student: _______________ Class: ________ Term: ________ Week: ________

Time: From ____am to ____am daily, for 2 weeks **without weighted belt** : []

<table>
<thead>
<tr>
<th>Date</th>
<th>In-seat Behaviour during morning session.</th>
<th>Specific Behaviour to monitor : Eg. Fidgeting, rocking</th>
<th>Indicate whether specific behaviour being observed occurs in the first 15 minute segment and again in the second 15 minute segment, using (Y) or (N) responses</th>
<th>Indicate type of behavioural presentation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Comment on type of prompt needed: verbal (Ve), visual (Vi) or physical (P) prompt to get the student to return to their seat.</td>
<td>Seg. 1</td>
<td>Seg. 2</td>
</tr>
<tr>
<td>MON</td>
<td></td>
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<tr>
<td>CT/TA:</td>
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<tr>
<td>TUES</td>
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<tr>
<td>CT/TA:</td>
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<td>THURS</td>
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<tr>
<td>CT/TA:</td>
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<tr>
<td>FRIDAY</td>
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<tr>
<td>CT/TA:</td>
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</tr>
</tbody>
</table>

Additional Comments:

______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________

____________________________________________________________
______________________________         ____________________
Class Teacher                                                    Occupational Therapist
# Record of Usage of Weighted Belt: Form 2

**Student:** ____________  **Class:** ________  **Term:** ________  **Week:** ________

**Time:** From ____ am to ____ am daily, for 2 weeks using weighted belt: □

<table>
<thead>
<tr>
<th>Date</th>
<th>In-seat Behaviour during morning session.</th>
<th>Specific Behaviour to monitor: Eg. Self-injurious behaviour</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Indicate maximum time seated before the student gets up from their seat.</td>
<td>Indicate whether specific behaviour being observed occurs in the first 15 minute segment and again in the second 15 minute segment, using (Y) or (N) responses.</td>
</tr>
<tr>
<td></td>
<td>Comment on type of prompt needed: verbal (Ve), visual (Vi) or physical (P) prompt to get the student to return to their seat.</td>
<td>Indicate type of behavioural presentation eg head-banging.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MON</th>
<th>Seg. 1</th>
<th>Seg. 2</th>
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</thead>
<tbody>
<tr>
<td>CT/TA:</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>TUES</th>
<th>Seg. 1</th>
<th>Seg. 2</th>
<th></th>
</tr>
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<tr>
<td>CT/TA:</td>
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</table>

<table>
<thead>
<tr>
<th>WED</th>
<th>Seg. 1</th>
<th>Seg. 2</th>
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<tbody>
<tr>
<td>CT/TA:</td>
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<table>
<thead>
<tr>
<th>THURS</th>
<th>Seg. 1</th>
<th>Seg. 2</th>
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<tbody>
<tr>
<td>CT/TA:</td>
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<thead>
<tr>
<th>FRIDAY</th>
<th>Seg. 1</th>
<th>Seg. 2</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>CT/TA:</td>
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</tr>
</tbody>
</table>

**Additional Comments:**

_______________________________________________________________________________

_______________________________________________________________________________

_______________________________________________________________________________

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**Class Teacher**  
**Occupational Therapist**
FEEDBACK FROM TEACHING STAFF:

Staff Member: __________________  Date:____________

1. Was the belt easy to use?
[ ] very easy  [ ] somewhat easy  [ ] moderately easy  [ ] not easy  [ ] difficult.
Comments: ______________________________________________________

2. Was the belt easy to keep clean?
[ ] very easy  [ ] somewhat easy  [ ] moderately easy  [ ] not easy  [ ] difficult.
Comments: ______________________________________________________

3. Were the forms easy to use?
[ ] very easy  [ ] somewhat easy  [ ] moderately easy  [ ] not easy  [ ] difficult.
Comments: ______________________________________________________

4. Was adequate and sufficient information provided by the therapist to allow for easy usage of the belt and forms?
[ ] more than adequate  [ ] somewhat adequate  [ ] moderately adequate  [ ] not much  [ ] less than adequate.
Comments: ______________________________________________________

5. Did you notice any positive change in the student’s behaviour while the belt was used?
[ ] significant difference  [ ] somewhat significant difference  [ ] moderate difference  [ ] little difference  [ ] no difference
Comments: ______________________________________________________

6. Did you notice any change in the student’s level of participation in the morning session?
[ ] significant difference  [ ] somewhat significant difference  [ ] moderate difference  [ ] little difference  [ ] no difference
Comments: ______________________________________________________

7. Would you continue to use the belt in the morning session?
[ ] Yes  [ ] No  [ ] Unsure
Comments: ______________________________________________________

8. What did you think of having a trial of the belt and of the belt itself?
Comments: ______________________________________________________

9. Are there any other comments you would like to add?
Comments: ______________________________________________________

Thank you for your time and assistance in completing this.
Dear Occupational Therapist,

As you are aware, this year we are working on the Best Practice Guidelines for Department of Education and Training (DET) Occupational Therapists: Supporting Students with Sensory Processing Challenges project. Guidelines will be designed as a framework from which school-based occupational therapists can make, communicate and evaluate decisions which enhance the education programs of students with disabilities who have sensory processing challenges. This is a need that has been identified by school-based occupational therapists and professional supervisors alike as requiring specific attention in order to ensure quality of service and confidence in practice.

This “Examination of Sensory Processing in Practice” questionnaire should take approximately 15 minutes to complete, and your responses will be anonymous. Please note, you will need to complete the tool within one session, without closing, to enable a valid record of responses.

This inquiry is designed to collect data from all DET occupational therapists about their practice in this domain. This data will inform the working group in the development of the guidelines. Please complete the survey by Friday 14 August.

We appreciate your time in completing this online data collection. If you have any questions, or have any difficulty accessing the link via your work computer, please contact Liz Hinder on Liz.Hinder@deta.qld.gov.au

Thank you for your contribution to the ongoing development of our quality occupational therapy services.


Sincerely,

Liz Hinder.
Examining Sensory Processing in Practice
Questionnaire

Please answer questions in relation to your own current (within past 2 yrs) professional practice within the Department.

1. Indicate the educational setting/s you are predominately servicing in relation to sensory processing issues.

☐ Early Childhood Development Program (ECDP) ☐ Primary School ☐ High School
☐ Special School ☐ Primary School with Special Education Centre or Program (SEP/SEC)
☐ High School with Special Education Centre or Program (SEP/SEC)

2. How confident do you feel in your OT practice supporting students with sensory processing challenges

<table>
<thead>
<tr>
<th>Not Confident</th>
<th>Highly Confident</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
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<tr>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

3. How do you rate your professional expertise (knowledge & skills) in the area of supporting students with sensory processing challenges?

- Assessing sensory processing challenges in students?

  Novice ☐ ☐ ☐ ☐ ☐

- Interpreting and reporting/communicating findings re: sensory processing issues?

  Novice ☐ ☐ ☐ ☐ ☐

- Collaborating with the team re: sensory processing?

  Novice ☐ ☐ ☐ ☐ ☐

- Providing intervention strategies and advice for curriculum adjustments re: sensory processing?

  Novice ☐ ☐ ☐ ☐ ☐

- Providing general (vs student-specific) team training and education re: sensory processing?

  Novice ☐ ☐ ☐ ☐ ☐
• Determining outcomes and/or effectiveness of intervention?

Novice 2 3 4 5

4. As part of your assessment strategy, are you using formal assessment tools specific to sensory processing? Yes/No

If yes, indicate tools:

- Sensory Processing Measure
- Sensory Profile
- Sensory Profile Supplement
- Short Sensory Profile
- Infant/Toddler Sensory Profile
- Adolescent/Adult Sensory Profile
- Sensory Profile School Companion
- Sensory Integration Inventory - Revised for Individuals with Developmental Disabilities
- Clinical Observations of Motor and Postural Skills
- Other, please specify…

As part of your assessment strategy, are you using informal assessment tools/strategies specific to sensory processing? Yes/No

If yes, indicate methods below:

- Checklist or evaluation tool from a published ‘sensory’ resource
- Unpublished checklist or evaluation tool
- Clinical Observations (Ayres)
- Interview of team members
- School/classroom observations
- Student records/file review
- Other, please specify…

5. What strategies/formats and communications are you using? (e.g. to report/explain results; support team understanding of related concepts; develop plans for curriculum adjustment/intervention).

6. Which intervention strategies and advice for curriculum adjustments re: sensory processing are you implementing?

*Please provide details and examples in the following categories: S- Student; E- Environment; T- Task; T- Tools*

(e.g.: sensory regulation/modulation ‘treatment’ programs; adjustments to human & non-human environments; adjustments to curriculum/timetable; specialised and non-specialised equipment & materials)
7. What general (vs student-specific) team training/education are you providing (describe focus of content and target audience/s)?

8. Are you using **formal** methods of determining outcomes and/or effectiveness of intervention?

Yes/No

- If yes, indicate methods
  - School Function Assessment
  - Goal Attainment Scaling
  - Pediatric Evaluation of Disability Inventory
  - Canadian Occupational Performance Measure
  - Other, please specify

Are you using **informal** methods of determining outcomes and/or effectiveness of intervention?

Yes/No

- If yes, indicate methods
  - Review of education goal attainment
  - Checklist or evaluation tool from a published ‘sensory’ resource
  - Unpublished checklist or evaluation tool
  - Interview of team members
  - Satisfaction feedback from team members
  - Pre and post intervention ratings or behaviour sampling
  - Other, please specify

9. Have you undertaken **formal** training and development re: Sensory Processing that you consider relevant to your EQ OT practice? Yes/No

If yes, please indicate

- Post Graduate Studies
- Accredited courses/training qualifications
- Research
- Other, please detail…

Have you undertaken **informal** training and development re: Sensory Processing that you consider relevant to your EQ OT practice? Yes/No
If yes, please indicate

- Workshops/Seminars
- Conferences
- Self-study
- Online training Modules
- Literature Review/Appraisal
- Action Research
- Peer/Collegial Critical Case Review
- Work-shadowing/Mentoring
- Other, please detail…

10.

- Detail the aspect of occupational therapy practice you find most difficult when supporting students with sensory processing challenges at school ………

- Detail the aspect of occupational therapy practice you find most rewarding when working with students with SP challenges at school………

11. How many years of experience do you have working as a school-based occupational therapist?

- <1
- 1-3
- 4-7
- 8-11
- 12 or more

Thank-you for your participation!
Supporting Students with Sensory Processing:
Resource Ideas to Consider

Published resources have strengths and limitations for each different application. Those listed here appear because some section of the resource, or the resource in its entirety has been found to be useful in supporting the work of school-based occupational therapists in this domain of practice. The Resource Appraisal Checklist, (Appendix 4) may be helpful to determine utility for a particular application.

Websites:

- [http://classes.kumc.edu/sah/resources/sensory_processing/index.htm](http://classes.kumc.edu/sah/resources/sensory_processing/index.htm)
- [www.sensorysmarts.com](http://www.sensorysmarts.com)


Autism Association of Western Australia. **Making Sense of the Senses for Children with Autism: a workbook for teachers and parents.** Autism Association of Western Australia


Colby Trott, M. (2002). *Oh behave! Sensory processing and behavioural strategies: a practical guide for clinicians, teachers, and parents.* Therapy skill builders, USA.


Pascale, K. (2010) *Can’t you see I’m SENSational? Can’t You See I’m Sensational? Understanding the way children learn, behave and play.* Knox Community Health Service


Bright Beginnings in Best Practice:
Supporting Students with Sensory Processing Challenges.

PowerPoint slide masters and accompanying activity sheets from a TADS workshop (2010) titled *Bright Beginnings in Best Practice: Supporting Students with Sensory Processing Challenges* are available to DET occupational therapists on the Learning Place, Therapy Blackboard Community - EDUCATION QUEENSLAND THERAPY (OT PT SLP) SERVICES (C6848OTP001).

The presentation materials provide some introduction to the Best Practice Guidelines for Department of Education and Training Occupational Therapists: *Supporting Students with Sensory Processing Challenges* to team members. The accompanying worksheets enable groups/networks or individual occupational therapists to review and reflect upon some of the key constructs of the Guidelines for practice development.
Assessment Tools

Expanded information regarding assessment tools, including those specific to the evaluation of sensory processing, is available to DET occupational therapists on the Learning Place, Therapy Blackboard Community. (EDUCATION QUEENSLAND THERAPY (OT PT SLP) SERVICES (C6848OTP001).