Meta-analysis of the effectiveness of individual intervention in the controlled multisensory environment (Snoezelen) for individuals with intellectual disability

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CRD summary
This review assessed the effectiveness of a Snoezelen approach in reducing maladaptive behaviours in individuals with intellectual disability. The limited evidence prevented the authors from making definitive conclusions and they recommended further research. The authors' cautious conclusions appeared appropriate given limitations with the included studies and poor reporting in the review should be taken into consideration.

Authors' objectives
To assess the effectiveness of a controlled multisensory environment (Snoezelen) as individual therapy for people with intellectual and developmental disability.

Searching
PubMed and ERIC were searched for published and unpublished articles without year or language restrictions. Search terms were reported. Other internet searches were undertaken (no further details were provided) and experts in the field were contacted. Two review articles (see Other Publications of Related Interest) were examined for relevant studies.

Study selection
Studies that assessed effectiveness of the Snoezelen approach as an individual therapeutic intervention to alleviate maladaptive behaviours in individuals with intellectual and developmental disability were eligible for inclusion. Case studies and reports were excluded, as were studies that reported insufficient data or statistics for use in the meta-analysis.

Included studies were of participants aged between five and 65 years (mean 33 years) with moderate to profound levels of intellectual disability. Some participants had a diagnosis of autistic tendency. The Snoezelen approach was compared with one of the following: baseline behaviour; active therapeutic intervention (involvement of a therapist) and a non-active control condition; or baseline behavioural findings compared with a change in adaptive behaviours within daily interactions after a number of Snoezelen sessions. Most included studies measured the frequency of adaptive and/or maladaptive behaviours (varying definitions were reported in the review). Some interventions looked at how behaviours were influenced during the intervention session; others measured changes in behaviour as they occurred in daily interactions. Interventions ranged between four and 50 sessions (average of 20 sessions per intervention per participant), carried out one to five times per week with durations that ranged from 20 to 49 minutes (average 30 minutes).

The authors did not state how many reviewers selected studies for inclusion.

Assessment of study quality
The authors reported the methodological structure of the included studies, but no further details were provided.

Data extraction
The different measures of adaptive and maladaptive behaviours were extracted. Adaptive behaviour outcomes were recoded so that this behaviour was referred to in the negative (an outcome of 7 would become -7) to allow comparison of the two outcome behaviours and enable mean differences to be calculated.

The authors did not state how many reviewers extracted the data.

Methods of synthesis
A random-effects model was used to calculate standardised mean differences (effect sizes). Hedges g was used to
correct for small-sample bias (0.20 represented a small effect, 0.50 a medium effect and 0.80 a large effect).

Statistical heterogeneity was assessed using the $I^2$ statistic. Subgroup analyses were conducted to investigate the effect of study design, assessment situation (behavioural changes with the Snoezelen setting (generalised behaviour) versus behaviours in other situations (non-generalised behaviour)) and type of outcome behaviour.

**Results of the review**

Ten studies (n=121) were included in the review: nine pre-post studies (three were also described as between-groups design and five as individual design); and one described as a between-groups study only. The authors reported that all studies showed weak methodological structure. Sample sizes ranged from two to 54 patients.

Comparisons of the Snoezelen approach versus baseline behaviour (four studies), an active therapeutic intervention (two studies) or a non-active control condition (three studies) resulted in moderate to large effect sizes (0.63 to 2.63), but did not reach statistical significance. All three comparisons showed evidence of statistical heterogeneity ($I^2$ ranged between 42% and 91%).

Comparison of baseline behaviour versus generalised behaviour after Snoezelen sessions (seven studies) indicated a significant improvement in adaptive behaviour post intervention resulted in a large effect size (0.76, p<0.001). There was no evidence of significant statistical heterogeneity.

Subgroup analyses indicated large effect sizes for all subgroups, with statistically significant results reported for pre-post design (effect size 1.99, p<0.05), assessment situation (generalised behaviour effect size 0.84, p<0.001 and non-generalised behaviour effect size 2.25, p<0.05) and maladaptive outcome (effect size 1.13, p<0.001). With the exception of generalised behaviour and maladaptive behaviour, the remaining subgroups indicated high statistical heterogeneity.

**Authors’ conclusions**

There was insufficient evidence to enable definitive conclusions to be made on the use of Snoezelen as a valid therapeutic intervention for individuals with intellectual and developmental disability when applied as an individual intervention. Further research was required.

**CRD commentary**

A clear review question was stated, but the supporting inclusion criteria were quite broad and criteria were not prespecified for comparators or outcomes. The literature search was adequate and included all languages, which minimised potential for language bias. Unpublished data were located and no date restrictions were imposed, which reduced the possibility that potentially relevant papers were missed. Study validity was not formally assessed, but the authors reported weak methodological structure for all studies, which may have affected the reliability of the subsequent conclusions. The authors did not state how many reviewers performed each stage of the review process, so reviewer error and bias could not be ruled out. Appropriate methods were used to investigate statistical heterogeneity. However, as there was evidence of significant statistical heterogeneity and the authors acknowledged the presence of clinical and methodological heterogeneity, it may not have been appropriate to combine the studies. The authors also acknowledged the small number of studies, small sample sizes and weaknesses with the study designs that had implications on the robustness of the findings. The authors conclusions were cautious and their suggestion for further research appeared appropriate, but the poor reporting in the review should be taken into consideration.

**Implications of the review for practice and research**

**Practice:** The authors recommended that clinicians continued to use the Snoezelen approach for the purpose of achieving relaxation and general positive sensorial experiences for individuals with intellectual disability. If the findings of the review were accepted, Snoezelen could be implemented as part of a structured conventional therapeutic regimen.

**Research:** The authors stated the need for well-conducted randomised controlled trials with larger sample sizes and more meaningful outcome measures. Future studies should also focus on the wider effects of a Snoezelen approach on the participants' life outside the Snoezelen environment. Further research should investigate other populations and
evaluate the efficacy of group intervention.

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