

# The Orthodontic Management of Patients with Profound Learning Disability

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**Abstract.** *The orthodontic management of patients with profound learning disability is described including a report of two cases. Close co-operation between the orthodontist and other providers of dental treatment is essential for the management of this group of patients, and a general anaesthetic may be needed to allow fixed appliances to be placed. The orthodontic treatment is co-ordinated with any necessary restorative or periodontal treatment. The moral and ethical questions raised by the treatment offered to this group of patients are discussed.*

*Index words:* General Anaesthetic, Learning Disability, Orthodontic Management.

## Introduction

Parents and carers of children with learning disability frequently enquire about the possibility of orthodontic treatment. It may be tempting to dismiss the possibility of orthodontic treatment, but with a pragmatic approach to the diversity of problems presented by this group, it is possible to treat these patients successfully.

The orthodontic management of patients with learning disability is poorly described in the orthodontic literature. Although there are a number of papers which describe the prevalence of malocclusion amongst this group of patients (Jackson, 1967; Gullikson, 1969; Nunn, 1987; Orelund *et al.*, 1987), their practical clinical management is not described in detail. Recently Becker (1996) raised the issue of orthodontic treatment for these children and provided guidelines which may allow orthodontists to gain therapeutic access to these patients.

Gullikson (1969) reported that malocclusion occurs more frequently in children with physical or mental disability than in healthy children. Orelund *et al.* (1987) reported that investigators into Down's Syndrome had found a higher prevalence of pre normal occlusion, independent of the age of the patient. For cerebral palsy the findings are not so consistent. Lyons (1951) found an increase in the prevalence of malocclusion in patients with cerebral palsy, but Magnusson (1964) did not support this view. Fishman *et al.* (1967) reported three times the prevalence of 'definitely handicapping malocclusions' in the cerebral palsy group compared with their siblings. Orelund *et al.* (1987) showed that orthodontic treatment was least likely to be carried out on patients with the most serious disability, and yet the most severely mentally retarded group had the highest frequency of malocclusion.

Jackson (1967) felt that children with learning disability should not be discounted merely because an 'ideal' orthodontic result was not possible. For these patients, the aims of orthodontic treatment may need to be modified from 'ideal' but orthodontic treatment may offer an aesthetic improvement and hence enhanced social accep-

tance. Jackson (1967) was the first author to report the use of general anaesthetics to facilitate orthodontic treatment.

Hausdorff (1980) recommended that orthodontic treatment of the mentally retarded should be on a selective basis and that, to be successful, appliance therapy must be adapted to the needs of the specific patient. The use of a multiband appliance with light wires was found to be the most effective appliance and the use of removable appliances was not recommended.

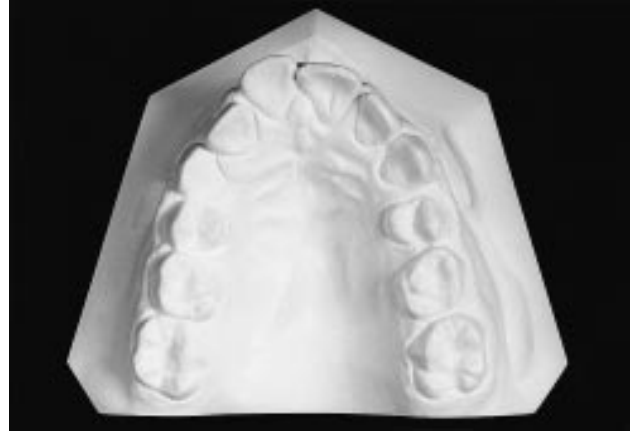
Shaw *et al.* (1980) described the dental and social effects of malocclusion and the effectiveness of orthodontic treatment. One of the most significant associations found was between an increased overjet with incompetent lips and the incidence of trauma to the upper incisor teeth (Jarvinen, 1977). For the patient with learning disability the risk to the incisor teeth is increased by the subsequent difficulties associated with restorative dental treatment. Nunn (1987) found that, although the prevalence of dental disease was not higher in the population with learning disability, the amount of unmet need was greater than normal controls.

Studies in the field of social psychology indicate that an unattractive physical appearance may evoke an unfavourable social response in many facets of social interaction. Physically unattractive individuals make a less favourable first impression than attractive ones. Research indicates that physical appearance is important in biasing judgements of social acceptability, ability and personality, whether the judges are adults or other children. Significantly, teachers have a less favourable academic expectation of unattractive children and this may influence the child's behaviour and thus becomes a self fulfilling prophecy (Shaw, 1980). This was supported by Langlois and Stephan (1981) who found that adults link behavioural expectations of children to their physical appearance and that learning opportunities could be affected. It appears that children can learn stereotypes concerning facial attractiveness by the age of 6 years (Dion, 1973).

A major perceived benefit of orthodontic treatment is an improvement in appearance (Khan and Horrocks, 1991). If orthodontic treatment is carried out to improve



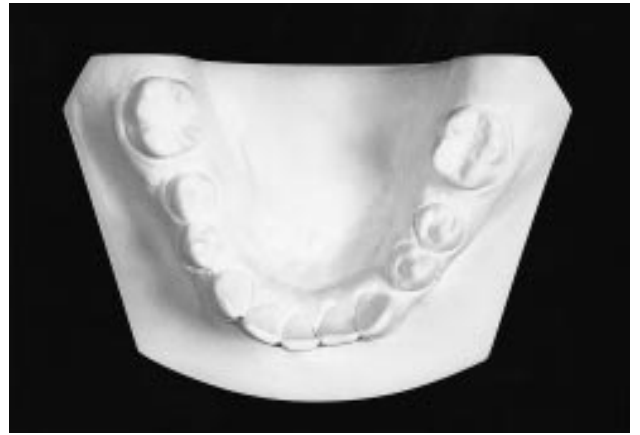
(a)



(d)



(b)



(e)



(c)

FIG. 1 Pretreatment study models for Case 1 (a–e).



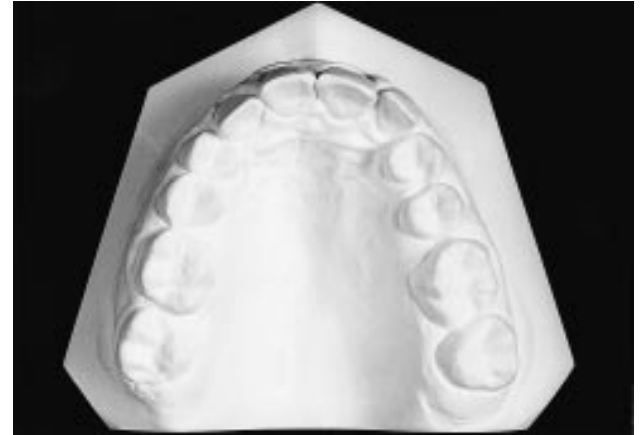
(a)



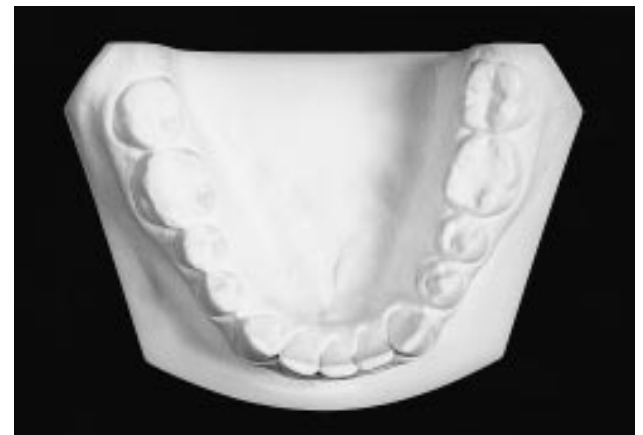
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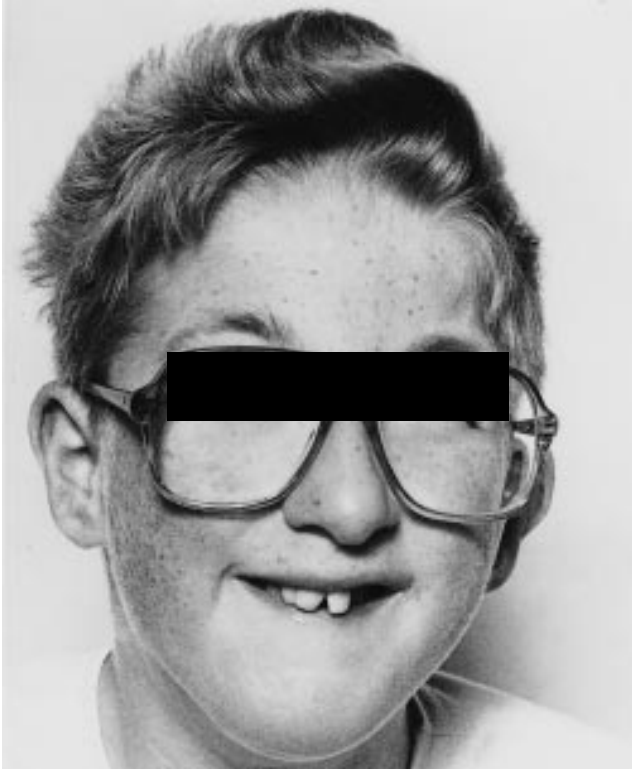


(d)



(e)

FIG. 2 Post-treatment study models for Case 1 (a-e).



(a)



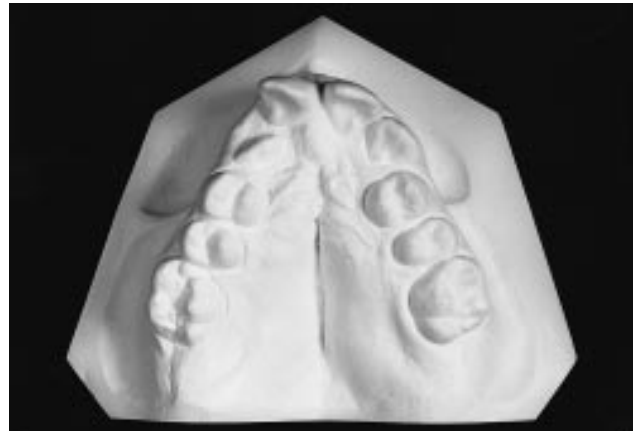
(b)



(c)



(d)



(e)



(f)

FIG. 3 Pretreatment study models for Case 2 (a-f).

*(Opposite)*  
FIG. 5 Post-treatment study models and facial appearance for Case 2 (a-f).



FIG. 4 Post-treatment intra-oral view for Case 2.



(a)



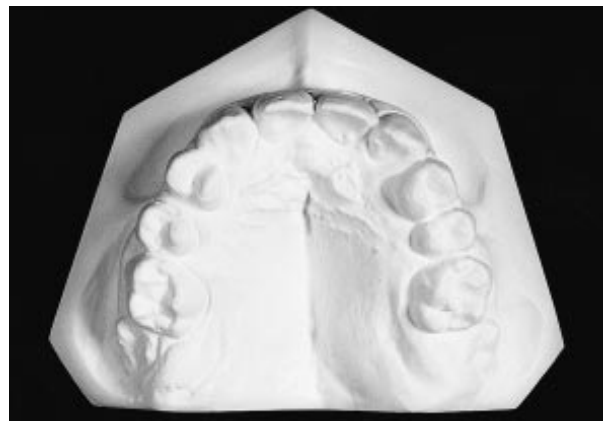
(b)



(c)



(d)



(e)



(f)

aesthetics, then patients with learning disability are equally appropriate patients. The learning disabled represent a group who have problems with social interaction and who suffer from a social handicap already. A poor dental appearance may lead to further negative stereotyping and rejection from their peers. Orthodontic treatment for a carefully selected group of these patients would seem to be justified.

### Patient Selection

Careful patient selection is essential for all forms of orthodontic treatment; however, for this group of patients patient selection is of paramount importance. A full medical history must be taken, and it is helpful to contact the patient's paediatrician or psychiatrist in order to clarify the medical condition. These patients must present with a malocclusion which satisfies the criteria for treatment in a hospital orthodontic department. The authors would recommend the use of both the dental health component and the aesthetic component of IOTN (Brook and Shaw, 1989). The parent/carer will be expected to support the orthodontic treatment and must understand the commitment regarding the number of hospital visits and treatment time. Parental concern and understanding is essential since the patients will have varying levels of awareness. Whilst the decision whether to undergo treatment is being made the clinician must be guided by the parent/carer with regard to the patient's tolerance. The parent/carer is best informed as to the child's level of tolerance to hospital visits and wearing of appliances. Considerable time is taken to discuss the child's tolerance to treatment so that both clinician and parent/carer are fully informed.

Oral hygiene must be of a standard that one would normally expect from any patient undergoing orthodontic treatment. This means that the parent/carer needs to be able to carry out the measures required for plaque control on a daily basis. Within our department it has been helpful for the hygienist to see these patients between every appointment with the orthodontist and the use of an electric toothbrush has been found consistently to be useful.

In our opinion the treatment of these patients is most conveniently carried out within the hospital orthodontic service where adequate time can be devoted to their special needs and medical back-up is readily available. The most experienced members of the orthodontic team should provide the care for these patients. Once the orthodontic treatment has been described and the risk/benefit ratio considered it will be found that only a highly selected group of patients will be appropriate for orthodontic treatment.

### Treatment Planning

The aims of orthodontic treatment for patients with learning disability must be modified from 'ideal'. The authors recommend that clinicians should aim for an aesthetically acceptable and functional result, but not necessarily for orthodontic perfection. This requires pragmatism and an ability to choose less conventional treatment plans at times. It is essential that visits are kept

short and are not too stressful for patient or operator. The majority of the more profoundly disabled patients are able to tolerate the adjustment of an appliance, but are unable to keep still for long enough to place brackets and bands. In some cases, a general anaesthetic will provide the means to take impressions, place orthodontic appliances and carry out any necessary extractions. As reported by Hausdorff (1980), removable appliances are not appropriate for patients with more severe learning disability since they are poorly tolerated. Fixed appliances are well tolerated in patients with learning disability and the incidence of breakages is not increased in this group. It is appropriate to use simple tipping mechanics, where possible, of the Begg or Tip Edge type so that tooth movements may be carried out quickly and simply. If a large overjet is being reduced the extraction of the maxillary permanent canines may be considered rather than the first premolars, as this will reduce the treatment time.

### Clinical Management

Close co-operation between the providers of routine care for these patients and the orthodontist is essential for their clinical management. If a general anaesthetic is thought appropriate for dental treatment, then placement of an orthodontic appliance can be carried out at the same time as any necessary extractions, restorative or periodontal treatment. In the author's unit there is a day case unit with full theatre facilities and a Consultant anaesthetist is available.

Under general anaesthetic, the orthodontic treatment is carried out after any appropriate restorative or periodontal treatment. Impressions are taken using alginate impression material and, following prophylaxis, brackets are bonded and bands placed. A no-mix orthodontic bonding agent and a glass ionomer-based cement are used routinely. A very high standard of moisture control can be achieved under a general anaesthetic; in fact, the conditions for bonding are excellent and a high standard of bracket and band placement is possible. The extractions are carried out following bonding of the brackets, but before placement of archwires.

Patients with learning disability frequently have anterior teeth which have been traumatized and it is advisable, if there is any doubt about bonding these teeth, to place bands anteriorly. If this procedure is followed, this group of patients are no more prone to breakages compared with a group of patients undergoing routine fixed appliance therapy. Routine orthodontic visits for adjustment of appliances should be kept short and archwire changes kept to a minimum. As far as possible, treatment is carried out using round wires and tipping mechanics. Tip-Edge brackets have been found to be particularly useful. However, some patients find they are able to tolerate more complex fixed appliance therapy once the appliances have been placed. During orthodontic treatment some patients become more tolerant during adjustment appointments, but equally there are those whose behaviour deteriorates.

So long as the appliance is being well tolerated and the oral hygiene is satisfactory then the fixed appliance is used for retention. A period of 6 months retention with the fixed

appliance, followed by fixed bonded retainers is recommended for this group, as removable retainers are usually poorly tolerated. Bonded retainers for the upper labial segment are particularly useful, but in some cases this may be complicated by previous trauma and restorative treatment to the upper labial segment teeth. Occasionally, crown and bridge work can complement permanent retention.

### Case Report 1

A 10-year-old female was referred by her general dental practitioner who had succeeded in placing an acid etch retained composite restoration on the maxillary right central incisor following trauma. The dentist was concerned that the increased overjet would place the patient at greater risk of trauma to the upper labial segment in the future.

The patient had severe mental retardation with hypotonia and ataxia. In addition, she had epilepsy which was only fairly well controlled with Tegretol. Although relaxed in the dental chair the patient was unable to communicate or to sit still for more than a few minutes. On examination the patient presented with a Class II division 1 incisor relationship on a skeletal II base with the maxillary right central incisor labially displaced and incompetent lips. The molar relationship was 1/4ll on the right and Class I on the left with a buccal crossbite. She was in the late mixed dentition with a congenitally absent lower central incisor. Conventional orthodontic views are not always possible for this group of patients. Photographs of the study models are presented (Fig. 1a–e).

As the patient presented too early for definitive orthodontic treatment a period of acclimatization to dental procedures was possible. The patient was seen on several occasions by the dental therapist, but the patient had a tendency to grab dental instruments from the operator and continued to co-operate for only short periods of time. Both the general dental practitioner and the guardian remained concerned for the long-term prognosis for the upper labial segment in view of the risk of trauma. It was decided that an orthodontic appliance should be placed under general anaesthetic. This procedure was arranged in conjunction with the community dental service who provided, under the same anaesthetic, restorative and periodontal treatment. Under general anaesthetic impressions were taken for study models, radiographs were taken and an upper fixed appliance was placed. Both maxillary canines were removed following the bonding and banding, but before any archwires were placed.

An MIA removable quadhelix was placed to correct the unilateral cross-bite and the upper teeth were bonded using Begg brackets. Reduction of the overjet was carried out using tipping mechanics with maxillary intra-arch elastics, which were changed daily by her guardian. The overjet was reduced in 11 months and the upper fixed appliance remained in position for a further 12 months, as a retainer.

The patient's co-operation had improved sufficiently by this stage to allow debonding of the appliance and provision of a removable retainer. The overjet had been fully reduced (Fig. 2a–e) and the intention was for the retainer

to be worn at night only, but the patient became distressed when her appliance was removed and insisted on full time wear. The upper retainer was worn full time for 1 year and she was only persuaded to part with it with great difficulty. As she entered her early teens, the patient suffered a series of psychological problems and her co-operation deteriorated. It is interesting to note that in this case orthodontic alignment would have been much more difficult to carry out if it had been left until a later stage. It is a feature of this group of patients that their behaviour is variable and unpredictable. Her occlusion, however, remains stable 4 years out of retention.

### Case 2

Rubinstein–Taybi syndrome is a rare genetic disorder characterized by learning disability, deafness, deformities of the hand and oral anomalies. This 11-year-old male had several of the most frequently found oral features, with a highly arched, slit-like narrow palate, severe crowding and hypodontia. His mother, who was highly motivated, presented with her son following her attendance at a lecture given by Dr Rubinstein where the orthodontic problems of patients with Rubinstein–Taybi syndrome had been described (Hennekam and Van Doorne, 1990).

The patient presented with a Class I incisor relationship on a mild Class II skeletal pattern, with palatally displaced lateral incisors, unerupted displaced maxillary canines and a congenitally absent lower left second premolar. He was caries free and had good oral hygiene, an unusual finding in this group of patients. He had attended the dentist regularly for routine preventive care, but his ability to co-operate was poor. He became very distressed when any attempt was made to place instruments, radiographic films or impression trays in his mouth, and he protested loudly!

It was elected to remove both upper lateral incisors together with the lower left second deciduous molar and the lower right first premolar. Following the removal of these teeth, once the maxillary canines had erupted (Fig. 3a–f) it was decided to attempt orthodontic alignment. Bands and brackets were placed under a general anaesthetic using a 'straight wire' appliance and a nickel titanium archwire was placed (0.016"). Adjustment appointments were kept to a minimum in view of his poor tolerance of dental procedures. His mother provided him with rewards at each visit and it proved possible to change the archwires, progressively eventually to 0.019" × 0.025" stainless steel. After a period of 9 months and a total of eight visits, the alignment, although not orthodontic perfection was satisfactory. The fixed orthodontic appliance remained in place as a retainer for a further 6 months.

An attempt was made to debond his appliance conventionally, but unfortunately the patient became extremely agitated and the attempt was abandoned. The appliance was therefore debonded under general anaesthetic and a fixed bonded retainer provided (Fig. 4). The patient's facial appearance and occlusion is illustrated with views of his study models (Fig. 5a–f). In spite of the severity of his learning disability the patient and his parents are delighted with the result. It was his mothers' persistence and perseverance which helped the treatment to succeed. It cannot be emphasized too strongly that the support and high

motivation of the parent or carer is a major factor in both the selection of these patients and the ultimate success of their treatment.

## Discussion

Following the publication of the Poswillo report (1990) the number of general anaesthetics provided in the general dental service has fallen. There has been a rise, however, in the number of general anaesthetics provided in the hospital and community services (Murray, 1993). The Poswillo report stated that the use of general anaesthetics should be avoided wherever possible. However, it was conceded that general anaesthetics will always be needed in certain circumstances.

The risks of providing a general anaesthetic are well described. The mortality rate in dental practice has not changed over the last 20 years. Between 1971 and 1975 there were 5.5 million general anaesthetics provided for dental care and 26 deaths of children were reported. More recently, between 1986 and 1990, 1.4 million general anaesthetics were given and seven children died. The incidence of fatality in children undergoing dental procedures under a general anaesthetic is therefore approximately 1:200,000. The general anaesthetic procedure itself carries a significant degree of risk and Poswillo suggested strict guidelines if such a procedure is undertaken.

It may however, be necessary to provide routine dental procedures for patients with profound learning disability under a general anaesthetic and this includes extraction of teeth recommended for the relief of crowding. Close co-operation with providers of routine care means that orthodontic procedures can be carried out at the same time. The orthodontic treatment may increase the time of the procedure, but otherwise would not place the patient under any additional risk.

Elective procedures on patients with a learning disability raise moral and ethical questions. There may be considerable pressure from parents/carers for some form of treatment to improve the patients' 'quality of life'. The risks of orthodontic treatment must be carefully explained to allow parents/carers to provide informed consent.

Elective procedures for patients with learning disability are not limited to dental treatment. Similar ethical and moral questions have been raised concerning elective surgery for patients with Downs Syndrome in order to improve their speech and appearance. Strauss (1983) felt that the passive acceptance of a child's handicap precludes recognition of his or her true potential. Strauss (1988) stated that treatment for the handicapped child should not depend on their estimated level of cognitive potential or present functioning. Lemperle (1986) supported parents who felt that elective surgery was a positive step which could be taken for a child judged to be seriously retarded, and advised that the parents' decision should be respected. Discrimination of any type against any individual with a disability, regardless of the nature or severity of the disability, is morally, ethically and legally indefensible, since persons with Downs syndrome and other developmental disabilities have equal human rights (Pueschel, 1989).

With the introduction of occlusal indices it is possible to

quantify the improvement in dental health and aesthetics which can be produced by a course of orthodontic treatment. Unfortunately, cases which have limited treatment objectives may produce disappointing results using an occlusal index, despite the aims of treatment being achieved. Following orthodontic treatment for patients with learning disabilities an improvement in the parent-child relationship had been reported, but an improvement in 'quality of life' or social acceptability is difficult to quantify, particularly if the patients themselves are not able to express their feelings.

## Conclusion

An approach to the orthodontic management of patients with profound learning disability has been described. The treatment available to this group of patients raises a number of moral and ethical questions, and the aims of any orthodontic treatment undertaken may not be 'ideal'. It is possible, however, to offer orthodontic treatment which can provide both a functional and aesthetic improvement in a carefully selected group of patients with learning disability.

## Acknowledgements

The authors would like to thank Gordon Taylor, Clinical Director of Community Dental Services, Blackburn, Bob Capelli, Chief Orthodontic Technician, Manchester Dental Hospital, and Lois Robinson, People First, London.

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