British Orthodontic Society

Orthognathic Treatment for Facial Deformity

This document has been produced by the Consultant Orthodontists Group of the British Orthodontic Society to provide information for purchasers on the management of patients undergoing orthognathic treatment to correct facial deformity.

What is orthognathic treatment?

An operation to reposition either the upper, lower, or both jaws, in individuals who have a large discrepancy between the size of the jaws in relation to each other, or in whom the jaws are abnormally positioned in relation to the cranial base (base of skull).

How are people who have these abnormal jaw relationships affected?

Discrepancies between jaw size/position are relatively common and those individuals affected will usually have a malocclusion (poorly aligned teeth and bite) which mostly can be treated using orthodontics (braces) alone. However a small proportion of individuals with severe jaw discrepancies often have significant facial deformity and are affected in many ways:

1. Dental and facial appearance is severely compromised and this leads to high levels of psychological distress, affecting interpersonal relationships and quality of life, particularly during the formative teenage years

2. Jaw function is compromised and this can result in:
   - Affected individuals having difficulties eating certain foods in public because they cannot manage them in a socially acceptable way
   - Damage to the gums and palate due to a traumatic bite which can compromise the prognosis of the teeth
   - Jaw muscle and jaw joint problems (Temporomandibular Disorders)
   - Speech difficulties

What causes a jaw discrepancy?

A discrepancy often develops without a specific cause although there may be a family history. Occasionally jaw discrepancies arise as a result of a growth disturbance, for example: following a jaw fracture in childhood; following repair of a cleft lip or palate; can be associated with a syndrome, such as hemifacial microsomia. A jaw discrepancy may be detected in early childhood but usually becomes more marked during puberty. The unusual jaw growth usually ceases in late adolescence and treatment is directed towards correction of the deformity once growth is complete.

What are the objective, evidence based benefits of the treatment of jaw discrepancies and facial deformity?

- Improvement in oral function (ability to bite and chew)
- Improvement in facial and dental appearance
- Long-term improvement in health-related quality of life, oral health-related quality of life and psychological function

The benefits of such treatment span a lifetime as it is usually carried out in young adults. Treatment is cost-effective i.e. major psychological and oral function changes are produced at relatively low cost, as measured by "QALYS".

Minor cosmetic procedures are not included, for example isolated rhinoplasty (surgery to the nose) or genioplasty (surgery to the chin) in non-syndromic cases, or in the absence of a history of trauma or disease.

What does the treatment for a jaw discrepancy involve?

Individuals with severe jaw discrepancies usually present to a maxillofacial surgeon or orthodontist following referral by their general dental, or medical, practitioner. At this stage a diagnosis is made and the patient referred to a multidisciplinary clinic for joint treatment planning with the maxillo facial surgeon and orthodontist. If, however the patient is still growing they will be reviewed annually until growth is almost complete.

Once facial growth is almost complete (at approximately age 16 - 18 years) a combined treatment plan will be formulated at a multidisciplinary clinic between the maxillofacial surgeon and orthodontist. It may also be necessary to involve a specialist in restorative dentistry if there are periodontal (gum) problems, missing teeth or other dental problems. Investigations required at this stage will include plain radiographs, plaster models of the teeth, facial and dental photographs. Simulation of the proposed tooth and jaw movements is carried out using cephalometrics (measurement of skull radiographs) in conjunction with treatment planning computer software.

It is recognised that the Gold Standard for orthognathic treatment and care is provided in the hospital setting. Optimal treatment is best provided by a team approach which is the model adopted in the hospital setting. The clinicians working in this setting have the appropriate training and experience to undertake this form of treatment. The multidisciplinary clinic environment enables close liaison between clinicians ensuring a coordinated seamless approach to patient care. However, in some circumstances orthognathic treatments are undertaken outside the formal hospital setting.

Treatment involves three main stages:

Stage 1 Pre-surgical orthodontic treatment:
Orthodontic braces fixed to the teeth are necessary to straighten the teeth in each jaw so that the two jaws can 'fit' together properly once the jaw discrepancy has been surgically corrected. This part of the treatment is undertaken by an orthodontist (usually a Consultant Orthodontist working in a hospital setting) and takes on average about 12-18 months, during which time the patient is seen at regular intervals to adjust the brace.

Stage 2 Surgery:
When the orthodontist feels the tooth alignment is satisfactory a final surgical plan will be agreed between the orthodontist and maxillofacial surgeon. Specially trained maxillofacial or orthodontic technicians carry out a simulation of the proposed jaw movements on plaster moulds of the teeth and, if required, construct acrylic splints which the surgeon may use at the time of operation to achieve the correct jaw repositioning.

The operation is carried out under general anaesthesia and involves a controlled surgical 'break' of either the upper or the lower jaw, or both. The incisions to uncover the bony surfaces of the jaws are normally made inside the mouth thereby avoiding external scars on the face. The mobile jaw fragment/s are then moved into the pre-planned position (using the acrylic splints as a guide), and fixed in the new position using bone plates and/or screws.

The operation will take between 2 and 5 hours depending on the complexity of the procedure. Normally patients are cared for as an in patient but if there are concerns about the airway, some surgeons and anaesthetists care for these patients in a High Dependency Unit (HDU) in the immediate post-operative period. Patients usually stay in hospital between 1 - 3 days post-operatively. Recovery time is variable but most individuals return to work or study 3 - 4 weeks after the operation.

Stage 3 Post-surgical orthodontic treatment:
Post-surgical orthodontics usually takes about 6 months and is needed to produce precise tooth movement, to achieve the best possible 'fit' of the teeth together. The braces are removed by the orthodontist and the patient is followed up in out-patients for up to 5 years post-operatively.

What are the risks of treatment of jaw discrepancies?

Major problems are rare and orthognathic treatment is a predictable procedure in terms of outcome.

Complications which can occur include:

- Damage to nerves - Following the jaw operation it is common to have transient numbness of the chin, tongue and gums due to 'bruising' of nerves in the jaw. In a small number of cases a residual area of numbness remains
- Damage to the teeth - If teeth are not adequately cleaned, or too many sugary or acidic foods and drinks consumed during orthodontic treatment, the surface of the tooth can be damaged irreversibly
- Relapse - Although rare, it is possible for the teeth and jaws to relapse (move back towards their original position) to a greater or lesser extent following completion of the treatment. Patients are given retainer braces to minimise this movement of the teeth

In what setting should this treatment be carried out?

Patients undergoing orthognathic treatment for the correction of facial deformity require complex interdisciplinary care, which should be carried out in an environment where the clinicians from both specialties routinely work together. Close liaison between the clinicians ensures that treatment is timely and that transitions between the various stages of treatment are smooth.

In the hospital setting, the maxillo-facial surgeon will have a subspecialty interest in orthognathic surgery and the treatment of facial deformity, whilst the orthodontist will have undergone a minimum of 2 years post-CCST training (over and above primary care orthodontic specialist training) in order to manage these complex malocclusions. The care setting should provide adequate facilities for diagnosis, including skull radiographs and access to specialist laboratory services and multidisciplinary team working. Regular audit should be undertaken by the multidisciplinary team to meet the requirements of clinical governance.

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