A patient's guide
To:
ORTHOGNATHIC SURGERY

WHAT IS ORTHOGNATHIC SURGERY?

Orthognathic surgery is also known as "Surgical Orthodontics". The treatment involves the skills of both an Orthodontist and a Maxillofacial and Oral Surgeon.

An Orthodontist can straighten crooked teeth by moving them into a more suitable position by means of braces. A Maxillofacial Surgeon can correct a bad bite by operating on the jawbone thereby repositioning the bone into its correct position. The aim of orthognathic surgery is to create the best possible bite (occlusion). This is achieved by orthodontic repositioning of the teeth followed by the corrective surgery. Benefits include improved chewing function, better swallowing and breathing patterns and possible speech enhancement.

In many cases a natural consequence of the surgery is improved facial balance and proportions, offering an aesthetic benefit.

WHO NEEDS ORTHOGNATHIC SURGERY?

Patients with a bad bite (malocclusion) can often be treated by the orthodontist alone. However, should the malocclusion be caused by a malrelationship of the upper to the lower jaw, the situation would best be corrected by surgical repositioning the offending jaw(s) into its ideal (orthognathic) position. Should orthodontic treatment alone be utilized for attempted correction of these problems, an extended treatment time with complex appliance therapy can be anticipated. Unfortunately, these treatment results have often not been very stable, and the facial appearance is often compromised.

A jaw malrelationship (malalignment) is often inherited genetically. This may affect either the upper or lower jaw or both simultaneously. They may grow excessively or show lack of development or grow asymmetrically. Birth defects or injuries to the jaws may also affect their alignment.

Depending on the severity of the malocclusion, it may result in difficulty in chewing food, abnormal speech, difficulty in swallowing and breathing problems. The altered chewing patterns may aggravate problems of the jaw joints (Temporomandibular dysfunction – TMD – pain, clicking, locking) and may aggravate chronic headaches (migraine). Very often a malocclusion will cause abnormal wearing patterns of the teeth (attrition) and may even result in teeth chipping and breaking. Long-term effects of the malocclusion may also compromise the health of the gums (periodontal disease), especially where the malocclusion has caused mouth breathing to occur. The dryness of the mouth predisposes the gums to infection (gingivitis), which may lead to periodontal disease. During mouth breathing the beneficial effects of purifying and humidifying the air being breathed by the nose and sinus passages are lost and thus may predispose to chronic sinusitis.

The face will be the most attractive when all the bones and teeth are in their ideal position. Therefore, facial balance and harmony created by orthognathic surgery usually has very pleasing aesthetic outcomes.

The surgery done alone is usually unable to provide a perfect bite. An orthodontist is able to assist the surgeon by positioning the teeth into their ideal positions in each jaw before surgery. Therefore, this treatment is almost always combined with orthodontic treatment. After surgery, the orthodontist will be able to move the teeth into a final perfect bite (occlusion). This improves ones ability to eat, speak more clearly, swallow more efficiently and breathe comfortably through the nose.

Treating a malocclusion by orthognathic surgery requires a team approach:

The dentist	-	who often recognizes the problem and refers the patient to the specialist – orthodontist or maxillofacial surgeon. The dentist is also responsible for monitoring the health of the teeth and gums before, during and after treatment.
The orthodontist	-	who aligns the teeth using braces and orthodontic appliances. Orthodontic treatment prepares the teeth for orthognathic surgery and then perfects the bite following surgery once the bones have healed in their new, optimal position.
The maxillofacial surgeon	-	who plans and performs the surgical procedures designed to correct the malocclusion and create facial balance and harmony

Some other conditions that may benefit from orthognathic surgery are:

- Open bite (the front teeth don't meet)
- Facial deformity (following facial trauma)
- Cleft lip and palate
- Receding chin
- Pronounced and/or asymmetric lower jaw
- Inability to make lips meet without effort
- Sleep apnea (snoring, difficulty in breathing affecting normal peaceful sleep)

In order to determine if you are a candidate for orthognathic surgery, discuss your symptoms with your dentist, orthodontist or maxillofacial and oral surgeon.

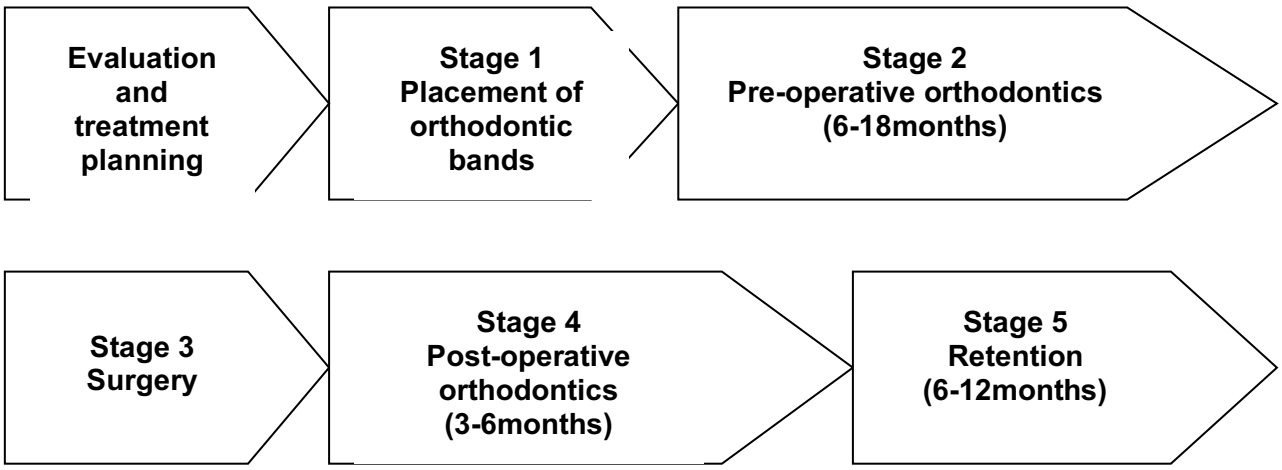
Particulars of evaluation, treatment planning and treatment

Pre-treatment evaluation and treatment planning

Unequal jaw positions, improper bites and symptoms that require orthognathic surgery will demand a team approach that usually include the general dentist, an orthodontist and a maxillofacial and oral surgeon. In order to diagnose your need for orthognathic surgery and to formulate a detailed treatment plan the team members need to work closely together.

After clinical examination and subsequent detailed analysis of your records (dental casts, x-rays and photographs), a diagnosis is made and a treatment plan is prepared. Once a definitive treatment approach envisaged has been established the patient will be informed about the orthodontic and surgical procedures. It is advisable that the patient is accompanied by parents/husband or wife (as applicable) to this case presentation by either the orthodontist or surgeon.

A Typical treatment profile



Stage 1: Placement of orthodontic braces

Should the treatment plan require extraction of some teeth (including wisdom teeth), this is done, and usually two to three weeks later the orthodontic bands are fitted to the teeth.

Stage 2: Pre-operative orthodontics (6-18months)

During this phase the teeth will be aligned in their optimal position as planned, in each jaw. No attempt will be made to correct the bite, which in some cases may actually become worse (i.e. the under bite or overjet may increase). This treatment phase will usually take on average between 9 and 18 months depending on the severity of the problem and patient cooperation. When the orthodontist is satisfied that the preparation is complete, the patient is referred back to the surgeon.

Stage 3: Surgery

The surgeon will now surgically reposition the jaw(s) into their most favorable relationship to establish a good occlusion (bite) and balanced facial proportions. After a short healing period of two to three weeks the patient returns to the orthodontist for the final correction of the bite (see notes below – "The Surgical Phase").

Stage 4: Post-operative orthodontics (3-6months)

The purpose of orthodontic treatment after the surgery is to refine the bite and usually involves minor tooth movement. Once the orthodontist is satisfied with the result the braces are removed. Patients often become very impatient to complete the treatment at this stage. It is however worthwhile to persist to achieve the best possible result. Keep in mind that the treatment is performed to last for the rest of your life and will probably be one of your most valuable assets.

Stage 5: Retention (6-18months)

When the orthodontic treatment has been completed the teeth that have been moved need to be stabilized in their new positions for a period of time. The orthodontist manufactures and fits a retention appliance, which must be worn by the patient as instructed by the orthodontist. This phase applies to all patients who have had braces on their teeth regardless of having had surgery or not.

The Surgical phase

Pre-surgical records: When the team determines that your teeth are in the correct planned position, surgery will be scheduled. Your surgeon will use new x-rays and models of your teeth and jaws to simulate the surgical movements of the jaw(s) and to accurately predict anticipated changes to your facial features. The surgeon may make a plastic splint to serve as a guide for accurate surgery.

Preparation for surgery: Orthognathic surgery is performed in a hospital under general anesthetic and in most cases you will be admitted into the hospital on the day of surgery. Your anesthetist will discuss the anesthetic procedure to be used and answer any questions about the anaethetist that you may have. A physical examination will be performed by the anesthetist to ensure you are in good overall health. You may receive medication to reduce normal pre-surgical anxiety.

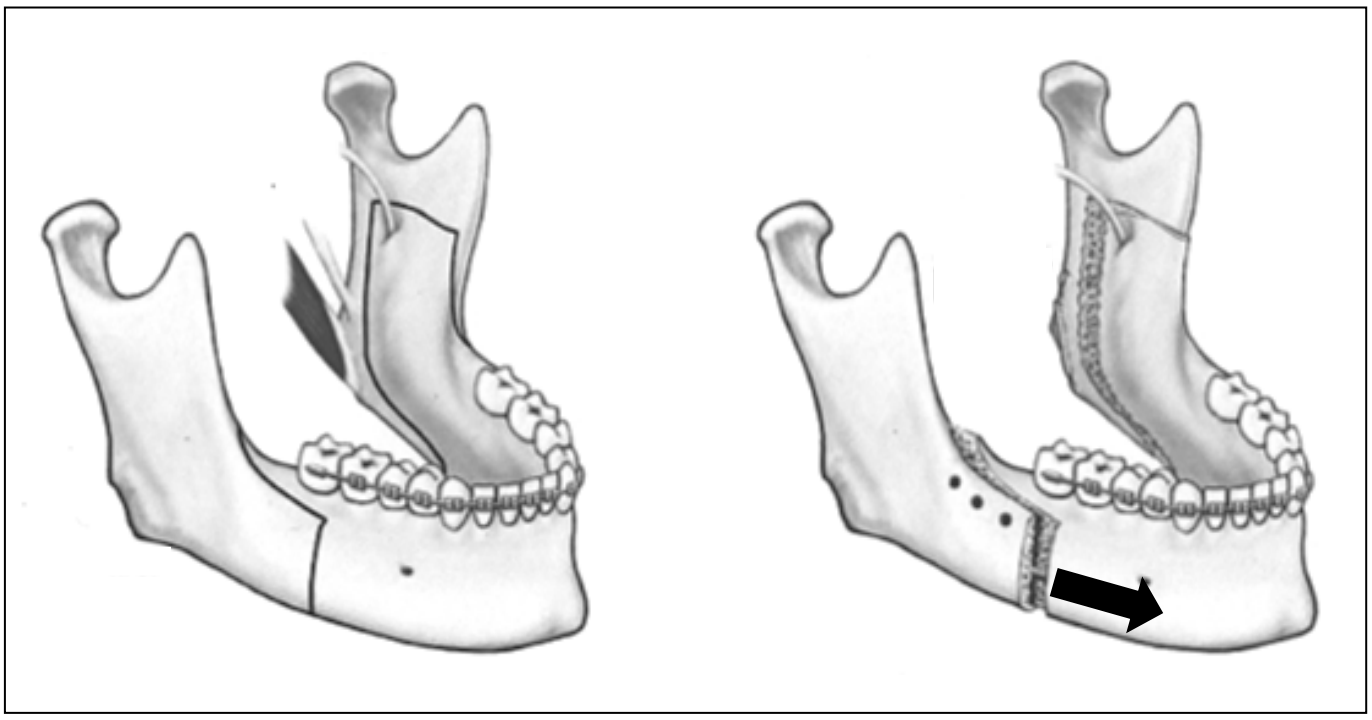
Surgery: Whilst there are a variety of surgical procedures that may be used the most commonly performed involve: surgery to the lower jaw, the upper jaw and chin. These procedures may be done in isolation or all together depending on your unique needs.

Lower jaw surgery (see figure)

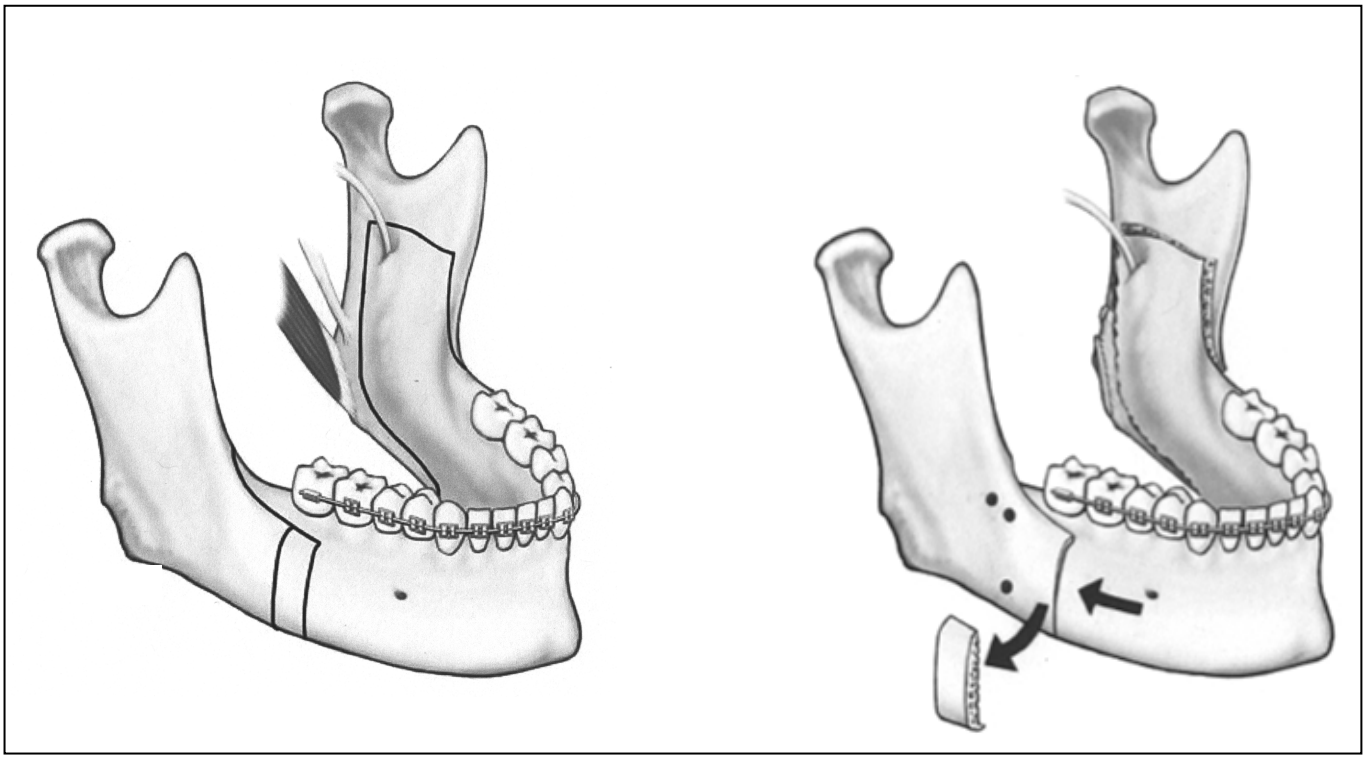
The lower jaw is split in a vertical plane on each side behind the last molar tooth. The tooth bearing part of the lower jaw can now be repositioned forward, backward or sideways as planned, to establish the most favourable relationship. The operation is carried out almost entirely from inside the mouth to minimize visible scars on the skin of your face. The incision on the bone is performed with a small burr or saw to allow the surgeon to split the jaw in a controlled manner. It is then moved to its new position and fixed with titanium bone screws and or plates. It is often necessary to make a small "stab" incision (a few millimeters long) low down on the side of the cheek to allow the screws to be inserted. The gum inside the mouth is sutured back into place using dissolvable stitches that usually takes 2-3 weeks to dissolve.

Light elastics (usually one on each side) are placed from the upper to lower teeth to guide the jaw into the "new" bite. Very rarely it may be necessary to wire the teeth together for a short period of time.

Lower jaw surgery may be performed as a single procedure or in combination with other orthognathic procedures.



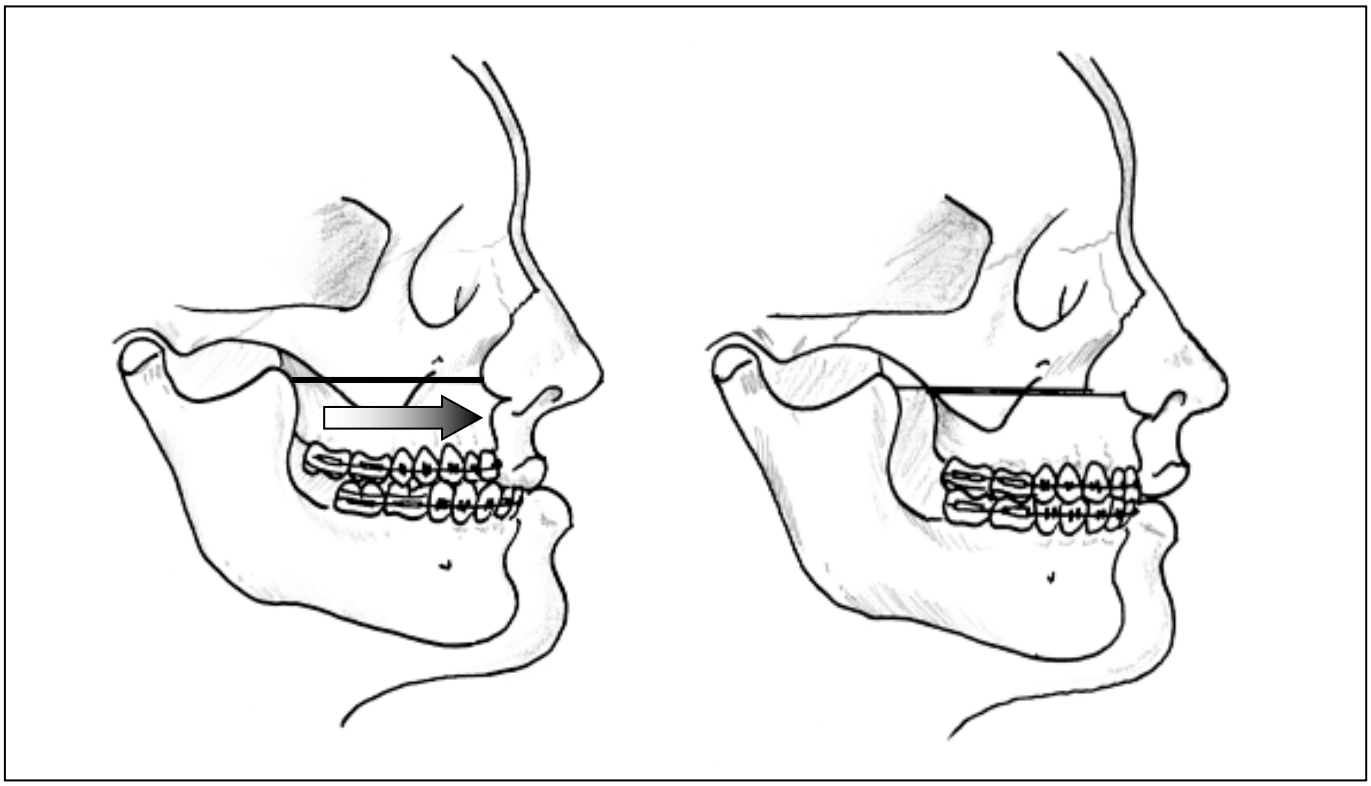
The surgical procedure for the advancement of the lower jaw is demonstrated in the figure. Note the small titanium screws on the side of the jaw used to fixate the jaw segments during the healing phase of the bone.



The surgical procedure used to set the tooth bearing segment of the jaw back (shorten the jaw) is demonstrated in the figure. Note the small piece of bone that is removed to allow the backward repositioning of the jaw.

Upper jaw surgery (see figure)

The incision is made on the gum above your teeth, inside your upper lip to gain access to the bone of the jaw. The upper jaw is then cut with a small saw in such a way as to free the tooth bearing part, allowing the surgeon to mobilize the jaw. Once mobile the jaw can be placed into its pre-planned position and fixated by means of small plates and screws. The gum is sutured back into place with dissolvable stitches that usually takes 2-3 weeks to dissolve. Light elastics (usually one on each side) are placed from the upper to lower teeth to guide the jaw into the "new" bite. Very rarely it may be necessary to wire the teeth together for a short period of time. (Upper jaw surgery may be performed as a single procedure or in combination with other orthognathic procedures).

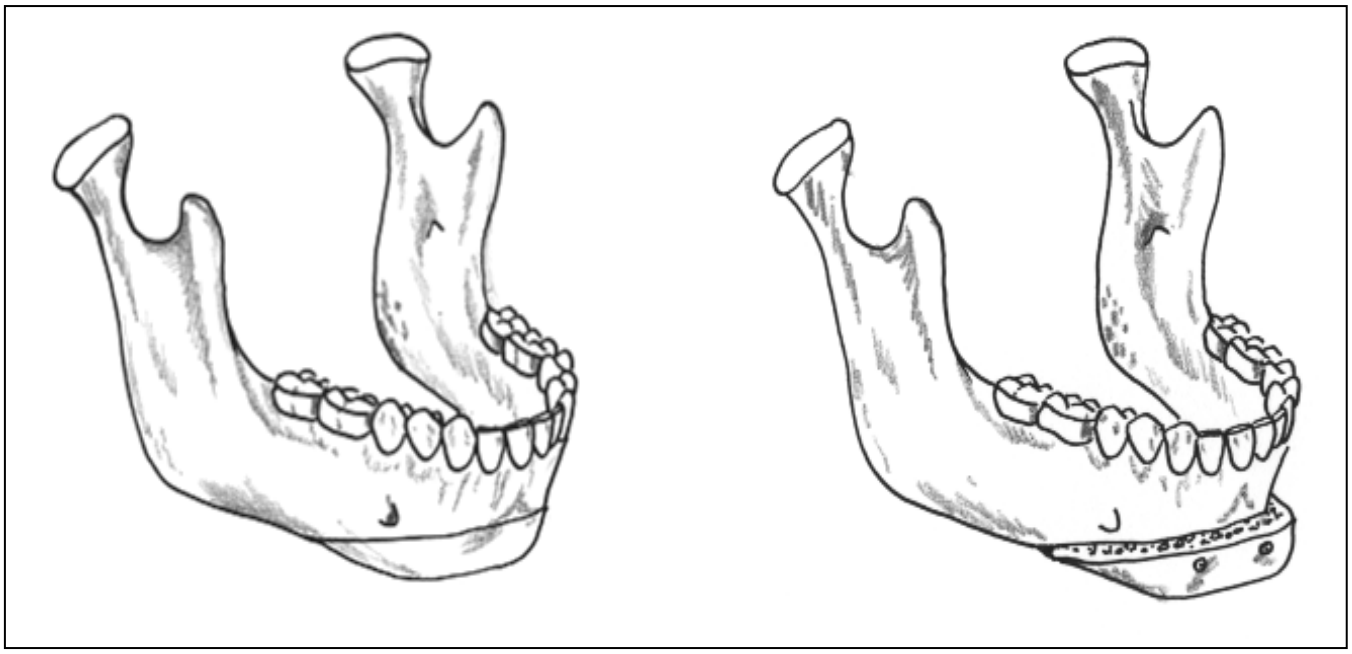


This figure demonstrates the surgical procedure used for the repositioning of the upper jaw. In this case the upper jaw is advanced.

Chin surgery (see figure)

Access to the chin is achieved through an incision on the gum inside the lower lip. The bone is then cut with a small saw to mobilize the chin. The chin segment can now be repositioned according to the treatment plan. The repositioned chin segment is held in position by means of titanium plates and or screws. The gum is sutured back into place with dissolvable stitches that usually takes 2-3 weeks to dissolve. Chin surgery, is usually performed in combination with other orthognathic procedures.

*The small titanium plates and screws used to hold the bone segments together are usually left in place and very rarely need to be removed. In some cases the surgeon may decide that resorbable plates and screws may benefit the patient.



The figure demonstrates the surgical technique used to reposition the chin. In this case the chin segment is advanced.

Post surgical period: Following completion of your operation, you will be transferred to the recovery area. There, your progress will be monitored very closely (by the nurses on duty). You will remain in the recovery room for about one hour until you are sufficiently awake to be transferred to your room. Occasionally, it may be necessary to send you to the High Care Ward where you will receive more intensive nursing during the first few hours following your surgery.

Post-operative pain: In most cases the procedure is surprisingly less painful than expected. However a certain amount of pain must be expected and the necessary pain medication will be provided. The discomfort is usually worse than the pain and may last for a few days to a fortnight.

Swelling: You can anticipate that swelling will occur and the degree of swelling is quite variable. More swelling usually occurs with lower jaw surgery than with upper jaw surgery. Swelling will increase for approximately 48-72 hours following surgery. At the completion of the surgery a plaster (soft pressure bandage) will be placed over your jaw to assist in controlling the swelling and you will lie with your head slightly elevated. Ice packs will be placed onto your face to further control the swelling.

Minor bleeding following surgery: It is common to experience some degree of bleeding following surgery, and minor nose bleeds may be expected for a period of 1-2 weeks following upper jaw surgery. This may be more pronounced when leaning forward. However, if bleeding continues for longer than 15-20 minutes contact your surgeon immediately.

Nausea and vomiting: Nausea and vomiting is not uncommon following these operations. This is sometimes the result of the anesthetic or an irritation of old blood in your stomach. Therefore, if vomiting does occur, remain calm and turn your head to the side so that any fluid produced clears your mouth freely. The nurses who care for you are used to dealing with patients who have had this type of operation and are properly trained to cope with this.

Physiotherapy: Post-operative physiotherapy treatment is recommended in order to:

- Decrease the degree of swelling and bruising
- Help reduce pain
- Accelerate healing
- Minimize scar tissue formation
- Restore normal jaw function

Numbness: A numbness of the lower lip and chin may be expected following lower jaw and chin surgery while the upper lip, cheeks, palate and gums may feel numb following surgery to the upper jaw. This is due to manipulation of with the nerves supplying sensation to these areas and is usually temporary. Feeling can be expected to return to these areas from a few weeks to several months following surgery. Unfortunately, in a very small percentage of cases the numb feeling may be permanent.

Nasal stuffiness: This may be caused either by the anesthetic tubes placed during surgery or from the surgical procedure in the upper jaw. When this occurs, it can be managed with a combination of nasal sprays and careful cleaning of the nostrils.

Blowing of the nose: Do not blow your nose or sneeze with your mouth closed for at least 1 week following upper jaw surgery. This can cause air to be forced into your cheeks and lower eyelids with immediate severe swelling. A nasal spray will be provided to help decongest the nasal passages.

Medication: An intravenous infusion (drip) will be attached to your arm during surgery to provide required medication and nutrients until you are able to take sufficient liquids by mouth. During the period of hospitalization, you will usually be given antibiotics, pain medication, an anti-inflammatory, mouth wash, and medicated cream for your lips and for upper jaw surgery – a nasal spray. Most of the medication will be continued on discharge from hospital. It is important to ensure that you receive your medication and take as prescribed.

Elastics: Elastics are usually placed onto the teeth from the upper to the lower jaw and are used to stabilize the jaws and to guide the teeth into the new bite. They are placed immediately after the operation and should not be removed until the first post-operative appointment. At your first post-operative visit the surgeon will instruct you how to apply and use the elastics. The elastics should be used as directed until your next appointment with your orthodontist.

Cleaning your teeth: It may be difficult to clean your teeth during the first few days following surgery. It is however advantageous to clean your teeth after each meal and, fortunately you, will have sufficient time to do it! A small soft tooth brush can be utilized for this purpose and in addition a mouth rinse will be provided. Soak the bristles in the mouth wash and brush slowly, in order to get maximum benefit from the antiseptic effect of the mouthwash.

Clear liquids: An adult requires approximately 2-3 liters of fluid every 24 hours as a normal fluid intake. Although this may seem like a large quantity, it can be achieved with constant sipping. It is important that you drink a sufficient volume of fluid to allow the discontinuance of the drip on the following day. Once you have fully recovered from the after effects of the anesthetic, you will be encouraged to drink clear liquids. This will often be easier directly from a cup or glass due to the loss of sensation in the lips. However a large catheter tipped syringe will be available to assist you if you find this method easier.

Splints: In selected cases, the use of a splint is necessary. This is a plastic template made after the dental casts have been positioned into the planned new bite. The splint is constructed of clear plastic (acrylic) and the teeth are wired into the splint to establish and maintain the correct jaw position. It is not visible to the casual observer and will remain in place until bone healing has been completed.

Wiring the teeth together: With the use of rigid fixation (small titanium plates and screws) which will hold the jaw segments together, it is seldom necessary to wire the teeth together. However in some selected cases it may be advantageous depending on the technique used. The necessity for this will be discussed with you prior to the operation.

Day of discharge and healing phase: Most patients are ready for discharge within two days after surgery. A period of rest for up to one week is recommended and after that you are encouraged to judiciously resume your normal activities. Although you may resume light physical exercises after 10 days, contact sport should be avoided for at least six weeks following surgery.

It is very important for the treatment team to be sure that all the oral and facial tissues adjust to their new relationship, that bone healing is normal and that final soft tissue settling takes place. You would therefore see the surgeon or orthodontist for regular evaluation visits.

Although 90% of the post-operative swelling disappears within the first 10-14 days, the initial healing phase will take approximately 6 weeks. Completion of the healing and firming up of the muscles can only be expected after 6-10 months.

Diet: Chewing forces applied to the operated jaws should be kept to a minimum during the first 3-4 weeks following surgery. Under no circumstances are you to chew solid foods. It is suggested that prior to your jaw surgery you acquire a blender and a food strainer. The usual post-operative program is: one or two days of liquids followed by a week of pureed foods and then three weeks of soft foods. Food and nutrition plays a vital role in our daily lives, especially where healing needs to take place. A soft diet can still be balanced providing all the necessary nutrients. It is important that all the components required for your rehabilitation should be available to your body. You may select foods that you can manage.

In order to ensure that you have a balanced diet, try and include something from each food group at every meal. A weight loss of approximately 3Kg may be anticipated during the post operative period. This is a reflection in most cases of loss of appetite, rather than the soft diet. By one week following surgery, your appetite should be sufficiently improved to maintain and possibly increase your weight.
It is very important to realize that the bulk consumed with liquid diet is not sufficient to satisfy an appetite. Hunger or appetite is relieved by distention of the stomach, chewing and the volume consumed, and a liquid or soft diet may not satisfy these demands. Thus more frequent intake is required and it is strongly recommended that your diet is taken as a breakfast, morning tea, lunch, afternoon tea, supper and before retire. This will keep the hunger pangs at bay!

Known risks and complications

Loss or alteration of nerve sensation, resulting in numbness or a tingling sensation in the face, jaw, teeth or tongue may occur as nerve fibres are regenerating and mending. During the healing phase you may experience the sensation of itching, warmth and a tingling over the affected areas. The change of sensation seldom remains for longer than 6 months. In a small percentage of cases the altered sensation may be permanent, particularly in the lower jaw.

Infection is a potential risk following any surgical procedure, and if an infection does occur it is usually treated with antibiotics. If swelling reappears after the initial swelling subsided, particularly if combined with fever and pain or pus development, contact your surgeon immediately.

Sinus complications, such as pain and/or postnasal drainage may occur following upper jaw surgery. Sinusitis symptoms should be reported to your surgeon.

Injuries to adjacent teeth and roots, fillings or bridgework can occur during orthognathic surgery which may require appropriate dental treatment.

TMJ (the joint of the jaw) pain or limited range of movement may occur following orthognathic surgery. This can impair chewing or speech function and may need physiotherapy to improve the condition. It usually improves with time.

Relapse of the jaw position or unexpected shifting of the jaw structure is uncommon but can occur. This complication may require surgery for correction. Should you feel that your bite has changed, contact your surgeon immediately.

Excessive post operative bleeding very seldom occurs. However any post operative bleeding, longer than 20 minutes, especially following upper jaw surgery, should immediately be reported to the surgeon.

Follow-up care: After the completion of your treatment and removal of the orthodontic braces your orthodontist and surgeon will want to see you periodically to monitor the result and to ensure that your teeth and jaws are staying properly aligned. Visit your family dentist regularly to ensure the health of your teeth and gums.

General

Your treatment team (orthodontist, surgeon or their staff) will strive to keep you fully informed at each phase of your treatment. If you are unsure of any aspect or need reassurance, please ask us and we will be delighted to be of assistance. Feel part of the team and enjoy the progress during treatment.

The aim of your combined surgical orthodontic treatment is to improve your bite (occlusion) and optimize facial balance. This usually results in an improvement in chewing efficiency, tooth longevity, speech, swallowing and breathing patterns. Hopefully this will have a very positive effect on your quality of life.