

ORTHOGNATHIC SURGERY



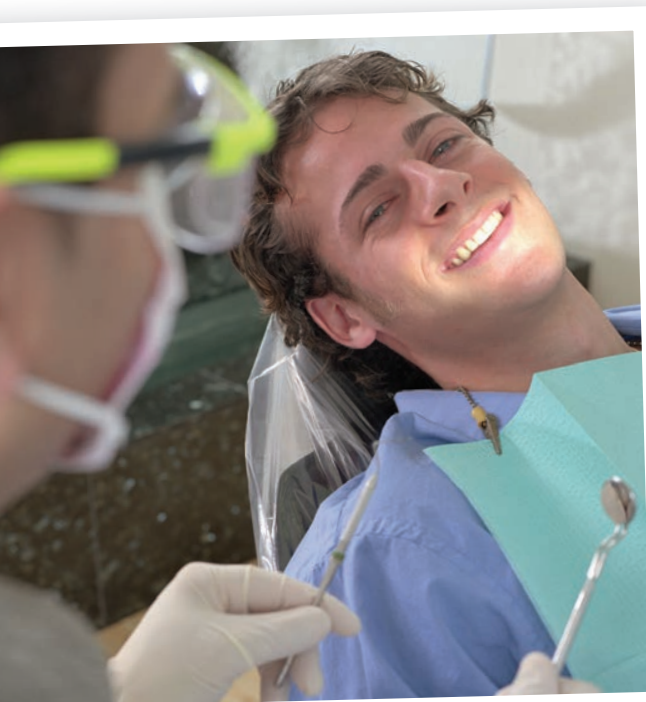
Improving Jaw Function and Facial Appearance

When Teeth and Jaws Don't Fit

Life can be awkward, even painful, when teeth and jaws don't fit together right. A too-small, too-large, or crooked jaw can lead to problems with chewing, speaking, breathing, and even sleeping. The shape of your jaws also affects the appearance of your whole face. **Orthognathic surgery** is a treatment that can reposition the jaws and teeth to help improve their form and function.

How Orthognathic Surgery Can Help

Some jaw problems are present at birth. Others develop as the bones grow or as a result of an injury. Orthognathic surgery aligns the jaws and facial bones. This helps improve function and relieve problems. Surgery is only one part of the treatment process. In most cases, treatment to move and straighten the teeth (orthodontics) is also needed. This is usually done both before and after surgery.



Your Role in Treatment

Orthognathic surgery and related treatments can take time, often more than a year. Starting treatment and not finishing it can make problems worse instead of better. So, before treatment begins, you must commit to the full process. Learn about the stages of your treatment plan and what to expect at each stage. Know the benefits and risks. Also, be sure to ask questions and get the answers you need. That way, you can be a full partner in your treatment plan. To help ensure good results, take care of your teeth and your general health during and after treatment.



Your Treatment Team Includes:

- **An oral and maxillofacial surgeon.**
This doctor performs surgery on jaws and facial bones.
- **An orthodontist.** This dental specialist works with the surgeon.
Treatment is done to move the teeth to help improve their function and appearance as well as how they work with the jaws.
- **A general dentist and other dental specialists.** A general dentist treats many different dental problems. You may also see dental specialists. For example, you may see a periodontist for gum disease. A prosthodontist can provide a crown, bridge, or implant if you need one.
- **Other professionals.** If needed, a speech therapist, physical therapist, or other provider can help you make the most of treatment.

Bones and Teeth Shape the Face

Bones are the framework for the face. The size and position of facial bones determine how well the teeth fit together. The position of the jaws and teeth affect chewing and speaking. The jaws hold and support soft tissues, such as the muscles, lips, and tongue. Also, the jaws and teeth play a major role in the face's shape and appearance.

Facial Bones and Teeth

The temporomandibular joints (TMJs) (one on either side) allow the lower jaw to move smoothly.

The lower jaw (mandible) supports the bottom row of teeth and gives shape to the lower face and chin. This is the bone that moves as the mouth opens and closes.

Mandibular nerve

Cheekbone

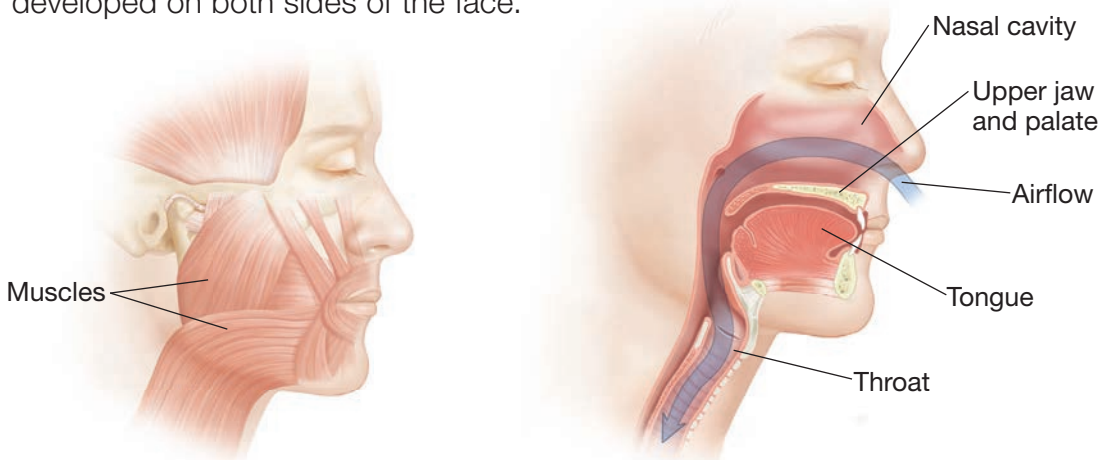
Maxillary nerve

The upper jaw (maxilla) holds the upper teeth, shapes the middle of the face, and supports the nose.

A good bite (occlusion) means that the upper and lower teeth are straight and fit together properly.

Soft Tissues of the Face

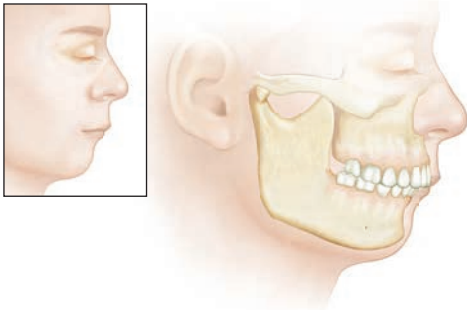
The lower jaw holds the tongue, which moves freely as you speak and eat. The upper jaw shapes the floor of the nasal cavity, allowing normal airflow. Normally, muscles are evenly developed on both sides of the face.



Common Problems

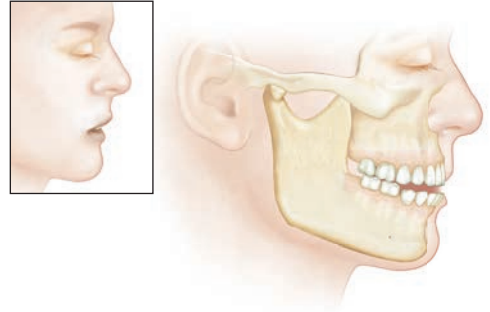
Some common jaw alignment problems are shown below. More than one problem may be present.

☐ Overbite



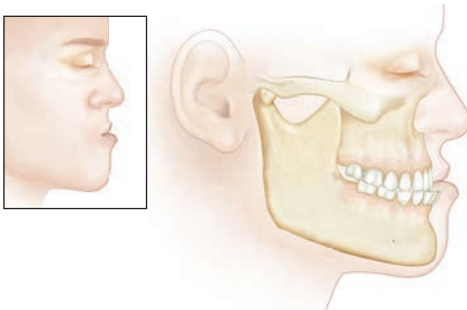
When the lower jaw is too far back (retrognathia), biting can be difficult. The chin appears weak or receding.

☐ Open Bite (Teeth Don't Meet)



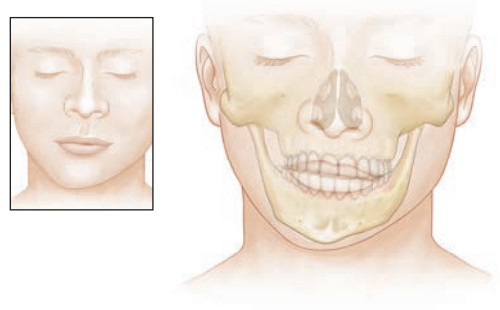
An open bite occurs when the back molars touch, but the front teeth don't close. It may be hard to close the lips. A too-long upper jaw or too-short lower jaw can be a cause.

☐ Underbite



A lower jaw that is too far forward (prognathia) causes the chin to protrude. Lower teeth may jut outward or overlap the upper teeth.

☐ Asymmetry (Jaws Are Uneven)



Uneven jaws are different sizes on each side. Or one side may be too far forward or back. The face may look off-center or crooked.

When Jaws Are Not Aligned

Poorly aligned jaws can result in a variety of problems, including:

- **Chewing problems.** It may be hard to bite into food or to keep food in the mouth during chewing. One or both TMJs may be stiff or painful.
- **Speech problems.** It may be difficult to make certain sounds or to speak clearly.
- **Breathing problems.** A narrowed or blocked airway may make breathing noisy or difficult. Sleep apnea (breathing that stops during sleep) may be one result.
- **Cosmetic problems.** Jaw problems may make a person dislike his or her appearance.

Your Diagnosis and Treatment Plan

Information about your jaws, teeth, and general health is gathered. Your surgeon and orthodontist use this information to create a treatment plan. The evaluation process often takes a few weeks.

Your Exams and Records

Your surgeon and orthodontist perform exams and take records. These include pictures, scans, x-rays, and models that show the current position of the teeth and jaws. Some records may be taken more than once.

Exams and records may include:

- **A medical history.** This includes questions about previous surgeries and injuries as well as general and dental health. Mention if you have plans for future dental work or facial cosmetic work.
- **A physical exam.** This includes a check of how the jaws and teeth work together. The health of the gums and teeth are checked. The size of the tongue and the airway are also checked.
- **Photographs and videos.** These may include photographs of the jaws, teeth, and face, and videos of you smiling or talking.
- **X-rays.** These show details of bones and teeth. **Panoramic** x-rays image the entire mouth. **Cephalometric** x-rays image the entire skull. Images of individual teeth may also be taken.
- **Scans.** These include **cone beam computed tomography (CBCT)** scans. They make a 3-D image of the head and jaws.
- **Models.** Molds of the teeth or digital scans are taken. Plastic, plaster, or 3-D digital models are then made. These show the fit of the teeth and jaws and can be moved to simulate chewing.
- **Other evaluations.** In some cases, a sleep study, speech testing, a psychological exam, or other evaluation is needed.

▶▶ A cephalometric x-ray of your head may be taken.



Forming a Treatment Plan

You will work with your team to discuss goals and create a treatment plan. Be sure you understand what each step involves and what you can and can't expect from treatment. A typical treatment plan begins with orthodontics and other dental work. Surgery is next, followed by more orthodontic work. Plans differ depending on the jaw problem being addressed. Factors such as your age and your health also play a role.

Treatment Stages and Time Frames

Your plan will likely include an approximate time frame for each stage of treatment. It can be hard to predict exactly how much time each stage will take. So be prepared to be flexible. As treatment progresses, your team will tell you if a stage is likely to take longer or shorter than first expected. Typical stages and time frames are shown here.

Typical Stage	Typical Duration	Description
Diagnosis and Treatment Plan	1–4 weeks	<ul style="list-style-type: none">• Exams and records• Consult with surgeon and orthodontist• Meeting with team to discuss overall plan
Preparation for Surgery	12–18 months	<ul style="list-style-type: none">• Dental work• Orthodontic work (braces) and checkups• Preparation for surgery and recovery• Quitting smoking, if needed
Surgery and Hospital Recovery	1–3 days	<ul style="list-style-type: none">• Surgery• Observation in the hospital• Starting a liquid diet
Recovery at Home	2–6 weeks	<ul style="list-style-type: none">• Recovery at home• Soft diet for 2 or more weeks• Postoperative exam by surgeon• Gradual return to normal eating and normal oral hygiene
Postsurgical Treatment	6–12 months	<ul style="list-style-type: none">• Finishing orthodontic treatment• Follow-up with surgeon• Routine dental care• Other needed dental care

Presurgical Orthodontics

Before surgery, orthodontic treatment to move and straighten the teeth is most often needed. Dental work is also required throughout the process. This presurgical phase is often the longest stage of treatment.

Preparing Your Mouth for Braces

To support the teeth, the gums and underlying bone must be healthy. Routine dental care throughout the treatment process helps ensure this. All cavities should be filled before surgery. If you have periodontal (gum) disease, a periodontist or general dentist will treat it. Other dental problems may also need to be addressed. For example, if you have wisdom teeth, they will likely be removed before you get braces.



Getting Your Braces

Braces help ensure that the placement of your teeth will work well with the position of your jaws after surgery. The braces use gentle pressure to slowly shift teeth. While you have braces, you'll need to avoid certain hard or sticky foods. You'll also need to be sure to brush and floss carefully. Your orthodontist and his or her staff will tell you more about taking care of your braces and your teeth.

Preparing for Surgery

Your orthodontist will work with you and your surgeon. You'll be told when teeth are likely to be in the right position for surgery. You'll be given plenty of time to get ready for surgery and plan your recovery.

Seeing Your Orthodontist

In the months leading up to surgery, you'll see your orthodontist often. He or she will check your progress and adjust braces as needed. More records are often taken. Your orthodontist will tell you if the timeline needs to be revised and will update your surgeon. Remember, treatment is designed to give you a good bite after surgery. At this stage, it may feel like your bite is actually getting worse. That will change after surgery! Discuss any concerns about your bite with your orthodontist.

Meeting with Your Surgeon

Shortly before surgery, you'll meet with your surgeon. He or she will evaluate your progress and make a final surgical plan. You'll have an exam and tests to make sure you're healthy enough for surgery. Also, more photos and models may be taken to plan the surgery.

What You Can Do to Prepare

During the months before surgery, there's a lot you can do to make your treatment and recovery easier. For example:

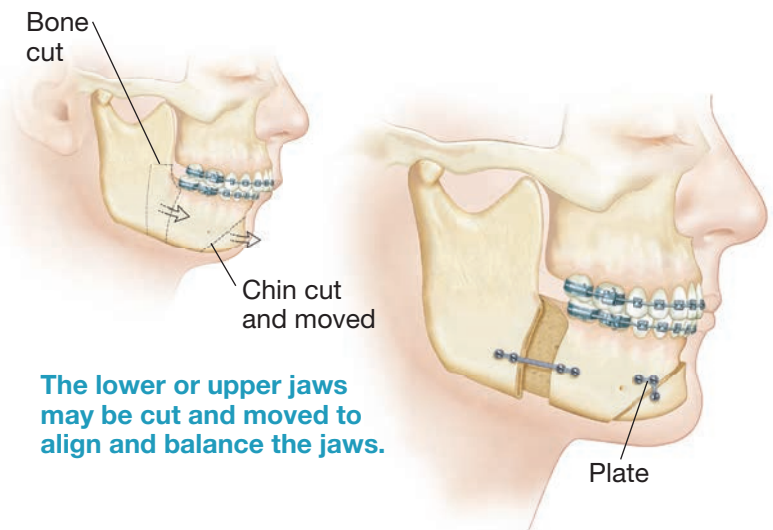
- **If you use tobacco, quit.** Smoking or using other forms of tobacco increases the risk for complications during surgery. It slows healing after surgery. It can also cause or worsen gum disease. The sooner you quit, the better. Ask your healthcare provider to help you make a plan to quit.
- **Arrange for time off to recover.** Plan your time off from work or school well in advance. Ask your surgeon how long your home recovery is likely to take.
- **Learn about your recovery.** Right after surgery, you won't be able to chew. In some cases, the jaw is immobilized (held shut). This may be for a couple of weeks to more than a month. So you'll need to plan what to eat, how to eat, and how to stay comfortable.
- **Make medication changes as directed.** Tell your surgeon about any prescription or over-the-counter medications, supplements, or herbal remedies you take. You may need to stop some or all of them before surgery.

Types of Surgery

The exact details of your surgery will depend on the problem being corrected. The goal is to bring the jaws into alignment and more in balance with the rest of the face. To avoid visible scars, incisions are often made inside the mouth. Braces remain on during and after surgery. In many surgeries, metal plates and screws are used to hold bones in place after they have been moved. These pages show procedures used to correct some common problems.

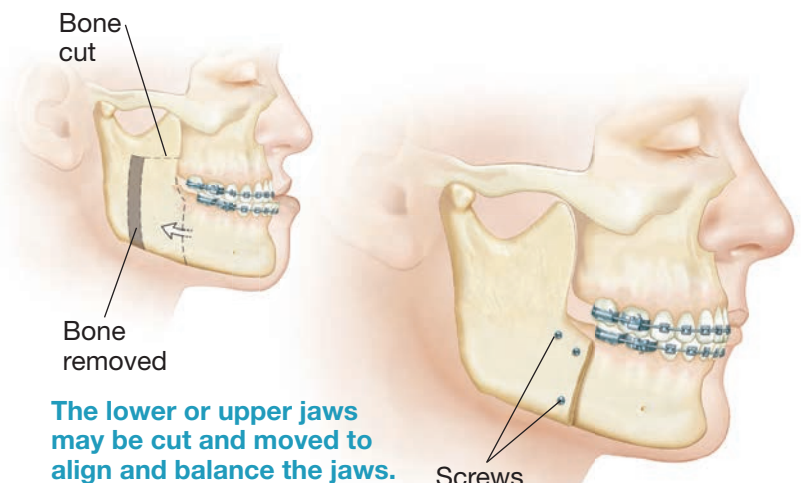
Overbite

The lower jaw may be divided and moved forward into a new position. In some cases, the upper jaw may be moved as well. A piece of the chin may be cut and shifted (genioplasty). The muscles and soft tissue remain attached and move with the jaws.



Underbite

The lower jaw may be moved back to make it less prominent and to place the lower teeth behind the upper teeth. Some bone may be removed. In some cases, the upper jaw may be moved as well. The muscles and soft tissue remain attached and move with the jaws.

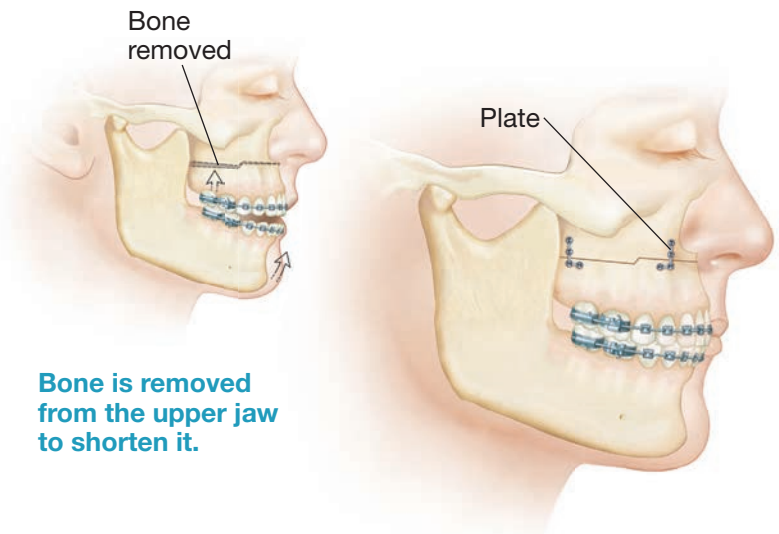


What Is Fixation?

In most surgeries, **fixation devices** (screws, plates, and wires) are used to hold the bones together. When the bone has healed, the devices are no longer needed. But the devices are not removed unless a problem develops. You won't be able to feel or see them, since muscles and soft tissue keep the contours of the jaw smooth and natural looking. In rare cases, "resorbable" screws or plates are used. These are slowly absorbed by the body and eventually disappear.

Open Bite

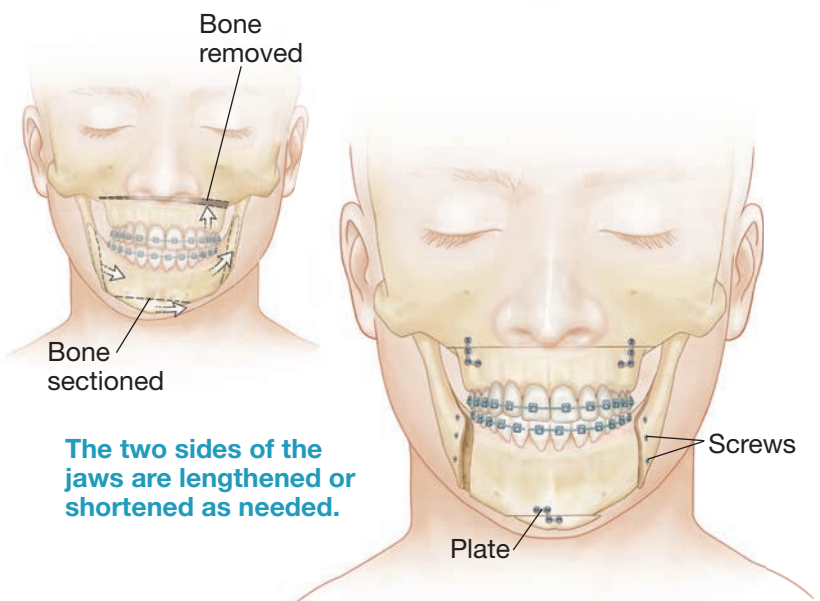
For an open bite, the jaws are repositioned to allow the mouth to close. A wedge of bone may be taken from a long upper jaw. This can also help correct a gummy smile. Surgery on the lower jaw may be done at the same time. Muscles and soft tissue are left intact.



Bone is removed from the upper jaw to shorten it.

Asymmetry

A wedge of bone may be removed from the longer side of the jaw. This bone graft can then be used to lengthen the shorter side. One side of the upper jaw may be moved up or down. The shape of the chin may also be altered (genioplasty). If more bone graft is needed, it may be taken from another part of the body. The muscles and soft tissue stay attached to the jaw.



The two sides of the jaws are lengthened or shortened as needed.

Your Surgical Experience

Surgery lasts several hours. Afterward, you may go home the same day or stay in the hospital for 1 or more nights. You'll be kept comfortable until you're recovered enough to go home.

Before Surgery

- Stock up on liquid foods that don't need chewing. These include total-nutrition drinks, soup, and milk. Foods that are easy to liquefy, such as bananas, are good, too.
- If you don't already have a blender, buy or borrow one.
- Arrange for an adult family member or friend to give you a ride home and stay with you after surgery.
- Don't eat or drink for as long as instructed before surgery, often for 8 hours. Ask the surgeon whether you can take your regular medications during this period. If so, take them with small sips of water.

The Day of Surgery

- When you arrive at the hospital, staff help prepare you for surgery. During this time, you may be asked your name and what surgery you're having more than once. This is for your safety.
- An IV (intravenous) line is placed to give you fluids and medications.
- You will be given general anesthesia to keep you free of pain during surgery. This puts you into a state like deep sleep.
- The surgery is performed. At the end of surgery, a plastic splint may be placed between the chewing surfaces of your teeth. In some cases, elastic bands or wires are attached to the braces to hold the jaws firmly shut. In other cases, looser elastic bands called "guiding elastics" are used. Sometimes, no wires or bands are needed.

Risks and Complications

Risks and possible complications of surgery include:

- Bleeding
- Infection
- Excessive swelling
- Nerve damage
- Problems with teeth or jaw
- Serious dehydration
- Problems with fixation devices
- Relapse (bones moving toward original positions)
- Risks of anesthesia



Right After Surgery

After surgery, you'll awake in a recovery room. Your IV will remain in place. You'll most likely have a device to give you oxygen. Cold packs will be put on your face to control swelling. Most likely, your face will still be numb from surgery. If you feel any pain, you'll be given pain medication. Nurses will watch you to make sure you're recovering well. You'll then be taken to a regular hospital room.

Recovering in the Hospital

Soon after surgery, you'll be assisted to get up and walk. This helps prevent complications and speed recovery. Try to talk if you can. Using your facial muscles helps reduce swelling. Liquids will be started as soon as possible to keep you hydrated. Note that it's common to have nausea after surgery. Vomiting when you can't open your jaws can be scary, but don't panic. Your stomach was empty for surgery and you're now taking only liquids, so the vomit will be liquid. Just lean over and spit it out. If you have any concerns, talk to your surgeon ahead of time.

Going Home

You will likely stay in the hospital for 1 or 2 days. Before you go home, you'll be told how to care for yourself. This includes what to do about pain, swelling, and nausea. You'll be given prescriptions for any medications you need. Be sure to have someone help take care of you when you first arrive home.



Recovering at Home

At home, focus on helping your body heal. Make sure to get plenty of calories and protein. Get up and move around, but avoid strenuous activity. Be sure to get lots of rest. Also, keep your mouth and teeth clean. This will help the incisions heal.

Controlling Swelling and Pain

For the first several days, swelling will likely increase. You may also have discoloration of the skin of your face and neck. To reduce swelling and pain:

- When you lie down, keep your head and shoulders higher than your heart.
- Apply a cold pack wrapped in a thin cloth to your face. Do this for 10 minutes at a time. Take breaks of at least 5 minutes between sessions.
- Take pain medication as directed. Take it on time—don't wait for pain to get bad to take it.

Nutrition and Fluids

Be sure to get plenty of fluids and nutrition. This is harder when you can't chew. Try total-nutrition drinks, protein powders, clear soups, smoothies, and blended foods. Avoid foods with pieces or seeds. Do not use a straw—the suction can stress the incisions in your mouth. The surgeon may provide a special syringe with a tube.

This helps push liquids into the mouth.

Once you can chew again, you can eat foods soft enough to cut with a spoon or fork. Then you'll gradually work your way back to eating normally.

Keeping Your Mouth and Teeth Clean

- If you can't open your jaws, brush what you can reach with a baby toothbrush.
- If a fluoride toothpaste or mouth rinse is prescribed, use it as directed.
- If your surgeon advises it, start using an oral irrigator on the lowest setting about 10 days after surgery.
- Aim to get back to brushing and flossing normally as soon as you can.

When to Call Your Surgeon



If you have any of the following problems, call your surgeon. Go to the emergency department if you can't reach your surgeon.

- Severe bleeding
- Pain that can't be controlled
- Nausea or vomiting that can't be controlled
- Swelling that continues to worsen after 3 to 4 days
- A fever of 100.4°F (38°C) or higher

Completing Your Treatment

Surgery isn't the end of your treatment. You still need orthodontic work to perfect your bite. And you'll need ongoing care and follow-up. Keep in mind that as the bones heal, the shape of your face may continue to change in subtle ways. This may take up to a year.

Follow Up with Your Surgeon

You'll see your surgeon soon after surgery and for follow-up visits. Your surgeon will monitor healing and make sure that bones and teeth are aligning as planned. X-rays or scans may be taken to check how you're healing. If wires or elastic bands were used, they will be removed or adjusted. You may be given special exercises to do as you heal. These help retrain the muscles that open and close your jaws.

Fine-Tuning Your Bite

Now that your jaw has been reshaped, your bite will look and feel better. But you will still need to continue orthodontic treatment. You'll have frequent orthodontist visits during this stage, which often lasts 6 to 12 months. When your braces are taken off, you will have a holding appliance. This is a removable plastic or metal-and-plastic device. It helps hold the teeth in their new positions.

Your Long-Term Care

After your braces are off, have other dental work as outlined by your plan. Use your holding appliance as directed. Brush, floss, and get regular dental care to protect your teeth and gums.





Feeling Better, Looking Great

Orthognathic surgery and related treatments can take time. So keep the payoff in mind. Your goal may be better jaw function, improved appearance, or both. Whatever your goals, stay committed to treatment. Then, enjoy your results!

Also available in Spanish



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