

Alveolar Bone Grafting - Why and When
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Clefts of the face take many forms, from a mere notch on the lip to a complete cleft of the lip, hard and soft palate. It is often forgotten that the bone which carries the alveolus (gum) may be also divided (see Fig 1).



fig1

This cleft of the alveolus causes many problems. First and foremost it means there is a hole from the mouth to the nose. There can be other less obvious problems which only become troublesome later in life. The cleft in the bone and gum means that teeth cannot grow properly and the floor of the nose does not develop normally. Missing teeth have a huge adverse effect on facial growth. Just think of an elderly person with no teeth to imagine how "fallen in" the face can appear. It is also important for children to have a nice smile with good straight teeth, both for eating and self confidence. The aim of alveolar bone grafting is therefore to repair the hole in the bone, provide better support for the base of the nose and produce new bone for the developing teeth to grow into.

So why do we not close this part of the cleft at the same time as the other "primary" surgery? In the past, attempts to close this alveolar cleft early, at the same time as the lip, have badly affected facial growth from the scarring.

It has been shown that if the alveolar cleft is closed after 7 or 8 years of age there is no adverse effect on facial growth. By contrast it has also been shown that if the cleft is closed after the teeth have tried to erupt through into the cleft, the results are poor. Most surgeons feel the best time for this primary surgery on the alveolar cleft is when the permanent canine tooth is three quarters formed, generally about age 8-9 years.

The best results of alveolar bone grafting are achieved by widening the upper jaw before the graft is placed. This usually makes the hole bigger, but provides better access for the surgeon. The widening of the upper jaw is usually carried out using fixed orthodontic appliances (braces) and the most commonly used brace is called a quadhelix (see fig 2). This phase of orthodontic treatment takes about 6-9 months prior to bone grafting.

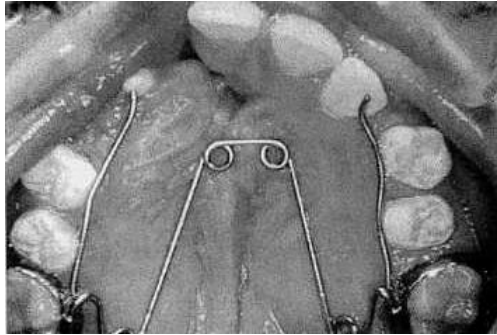


fig2

The principle of the surgery is to close the hole in the nose floor, place bone graft into the gap, and then close the gum over the bone. In some hospitals the floor of the nose is closed when the lip cleft is closed and these units get the best results. Often, however, this does not happen and the nasal layer is closed at the time of the grafting.

After the surgery is a critical period. In the first 10-14 days keeping the mouth very clean is so important in ensuring a good result. Careful tooth brushing and copious mouth washing with a special chlorhexadine mouthwash pays off handsomely! Why is it so important? When the bone is moved into the cleft it is effectively "dead" bone, and it has to get a new blood supply to the cells. At this time it is very vulnerable to infection. To help increase the amount of tightly bound gum (attached gingiva) we may take some baby teeth out before surgery as this can double the available gum for cover.

Where does the bone come from? Almost every bone you can think of has been used! The most common site has been the hip bone, where the hip is opened up to allow the bone to be scooped out. This unfortunately is quite painful. We have found that this is the main reason for children to have to spend more than one night in hospital. Using a trephine or tube to harvest the bone causes fewer problems. We have also opted for taking the bone from the shin bone below the knee. We have found far fewer complications for the children both at the site of the graft and also in terms of pain and time in hospital. Virtually all go home the next morning. Complications are rare and minor. The scar is only a few millimetres long and usually matches all the football scars!



fig3

What happens after the bone graft? This phase of the treatment requires a lot of patience. It may take several months or even a year before the canine tooth erupts through the new bone graft (see fig 3). During this time orthodontic treatment may continue to align the teeth, but full braces cannot be placed until all the permanent teeth have erupted into the mouth. Once the teeth are through the orthodontist can align them and produce that beautiful smile you've always wanted! (see fig 4)



fig4

What's new or around the corner? In the US there is a tendency to operate a little younger and indeed British surgeons may choose this option as there may be some benefits. There are promising developments using special growth factors to make new bone without the need for bone grafts. This has been done in animals and in some non-cleft situations. We think that the use of this technique may become available in the future. Who knows, maybe soon we will be able to take something out of a bottle, place it in the alveolar defect and grow new bone!