

ORAL BONE LOSS

There is very little scientific information available concerning the long-term effects of congenitally missing teeth (teeth missing at birth) on the growth and development of the jaws or on the long-term maintenance of the volume of bone of the upper and lower jaws.

The part of the bone of the jaw that is normally present to support the teeth, the alveolar bone, develops to support the teeth. In individuals with teeth, alveolar bone usually will atrophy or "resorb" when the teeth are extracted. The shrinkage process proceeds at different rates in different people, possibly affected by the sex of the individual, genetics and nutrition, or systemic conditions such as osteoporosis or diabetes. However, if a person never develops teeth, they will not develop alveolar bone. Therefore, that person has no alveolar bone to lose or "resorb" and starts out with conditions unfavourable for wearing a dental prosthesis such as a complete or partial denture.

One study involving 16 families found that individuals affected by ED had lower than average growth and development of the jaws. In limited studies at the National Institute of Dental and Craniofacial Research, it was found that individuals with ED and many congenitally missing teeth in the lower jaw, had about the same bone height in the front part of the lower jaw than a group of much older patients, not affected by ED, who had worn complete dentures for many years. It is of interest that several studies in animals have demonstrated that lack of teeth or a diet limited to soft foods, will adversely affect muscle development and jaw growth. Possible, but very tentative, conclusions from these studies are that the lack of natural teeth does adversely affect the growth and development of the jaws and that patients with congenitally missing teeth start out with significantly less bone to support dentures than patients who lose their teeth in middle age.

Studies on adults indicate that placing dental implants in the jaw to support dentures does decrease or stop bone loss and in some cases may reverse the bone loss in some areas of the lower jaw. However, all of these studies have been done on adults. There are no published longitudinal prospective studies of implants used in preadolescent or adolescent children. Longitudinal prospective studies of dental implants used in children with many missing teeth are needed to determine whether placing dental implants will facilitate increased muscle function and positively affect diet and the growth and development of the jaws.

An unresolved question is at what age bone resorption or atrophy begins when a person is wearing a removable denture. Without evidence to the contrary it may be reasonable to assume that as long as a patient is in a "growing" mode (approximately to age 18-20) the bone supporting the denture(s) will be maintained, but that once the individual matures, bone resorption or atrophy in areas of the jaw supporting the denture may begin. If this is true, then there is no urgency to place implants at a young age to prevent bone loss.

Over the past several years dentists have developed several techniques to increase the volume of bone within the jaws. These techniques include bone grafting, guided tissue regeneration, and distraction osteogenesis. Bone may be obtained from donor sites within the mouth or from other areas in the body such as the hip or even part of a rib. The bone may be transplanted to sites within the mouth to repair fractures, correct congenital defects, or increase the volume of bone available for the placement of implants. Guided tissue regeneration employs surgery and a manufactured membrane (the type used originally was a type of Gore-Tex) to guide an increased growth of bone in the area of surgery. Contemporary distraction osteogenesis is a technique which uses sophisticated surgical techniques and custom fabricated devices to guide the movement of surgically sectioned pieces of bone in a desired direction. Bone fills in behind the moved pieces and appropriate soft tissue growth "automatically" accompanies the bone growth.

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