ALTERNATIVE SINUS LIFT TECHNIQUES
Literature review

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SUMMARY:

The sinus lift techniques had a lot of modifications through the years. In 1960 Boyene - published sinuslift with lateral access. In the beginning it was used for achieving an optimal intercrestal distance needed for denture making. But in the 1980 Boyen and James started to place implants in the newly created bone. The wish of patients and dentists for minimalivasive methods lead to the development of new innovation techniques.

INTRODUCTION:

The sinus lift techniques had a lot of modifications through the years. In 1960 Boyene - published sinuslift with lateral access. In the beginning it was used for achieving an optimal intercrestal distance needed for denture making. But in the 1980 Boyen and James started to place implants in the newly created bone.

Although the technique of lateral access undergoes various modifications, it remains an integral concept. Despite its' highly invasive nature, it is necessary as a sinus lift method. (Fig. 1) As a result of the pursuit of less invasive method, in 1994 Summers made the surgical protocol easier, offering crestal access. In the beginning, the ostetome technique was used for congesting the relatively soft bone tissue of the upper jaw primarily. This improved the primary stability of the implants - a guarantee for success. Subsequently, using the elasticity of the bone (Fig. 2) ,Summers started floor dilatation of the sinus, thus increasing the length of his implants. The disadvantages of this technique are its limited indications - the height lack of 1-2 mm and the absence of direct visual control of the state of the membrane. Summers developed his technique, using the fractured sinus floor as an osteotome and putting the grafting material throurh the osteotome hole (Fig. 3). Later, Summers' technique was modified and the original concave, cutting osteotomes were replaced by convex and rounded ones (Fig. 4).

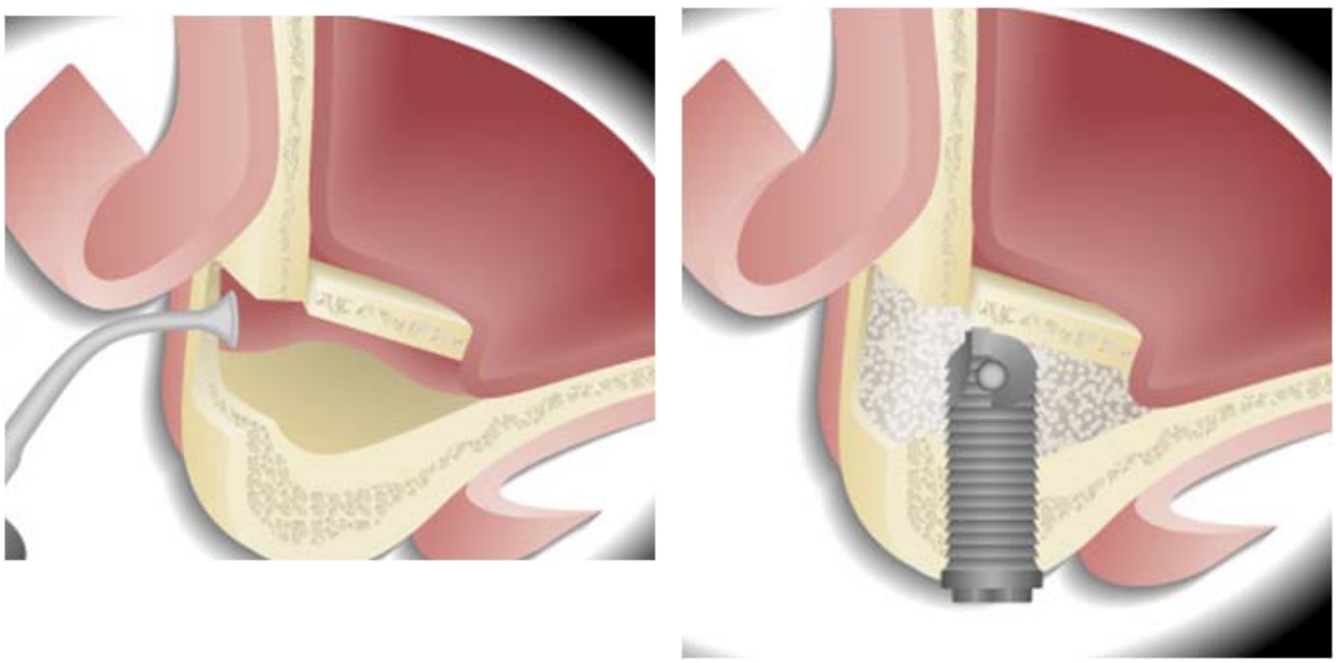

Fig. 1. Sinuslift with lateral access.

Fig. 2. Sinus lift by dilatation, without interruption the integrity of the floor.

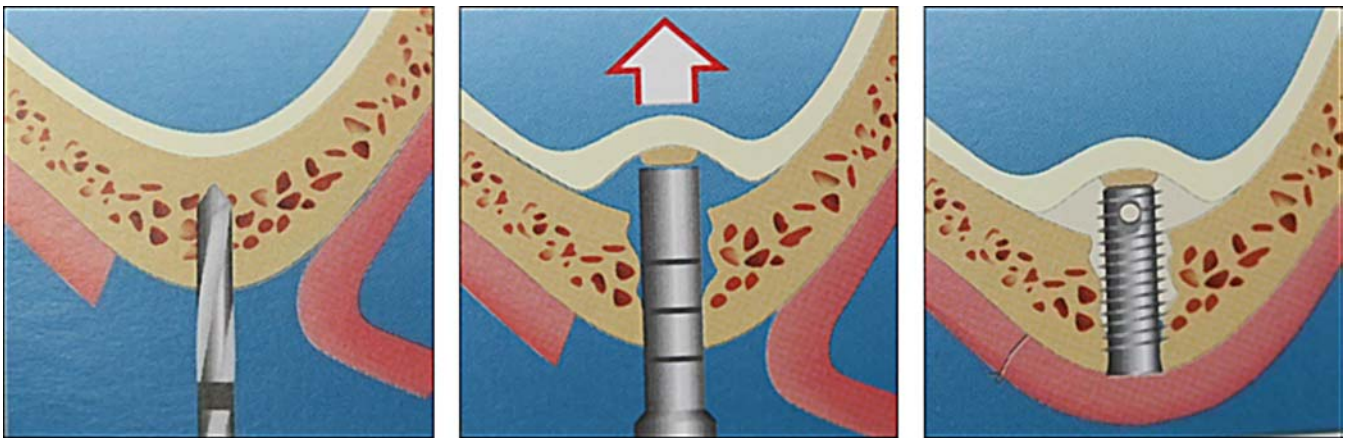

Fig. 3. Summers' osteotome technique.

Fig. 4. The modified Summers' osteotomes.

The main difference of the modified osteotome technique, is that we don't fracture a fragment in the sinus floor. The rounded osteotoms permit safely comprimition of bone after preparing the pilot hole, expanding of the hole, extrusion of the graft in the sinus cavity and placing of the implant.

Another technique with crestal access is the balloon sinuslift. (Fig. 5)

This is an elegant minimum invasive technique, using an elastic catheter. Forcing saline in the catheter, we swell the balloon and push out the membrane. Aside from its higher costs (Fig. 6, Fig. 7) this technique is accessible and with predictable results.

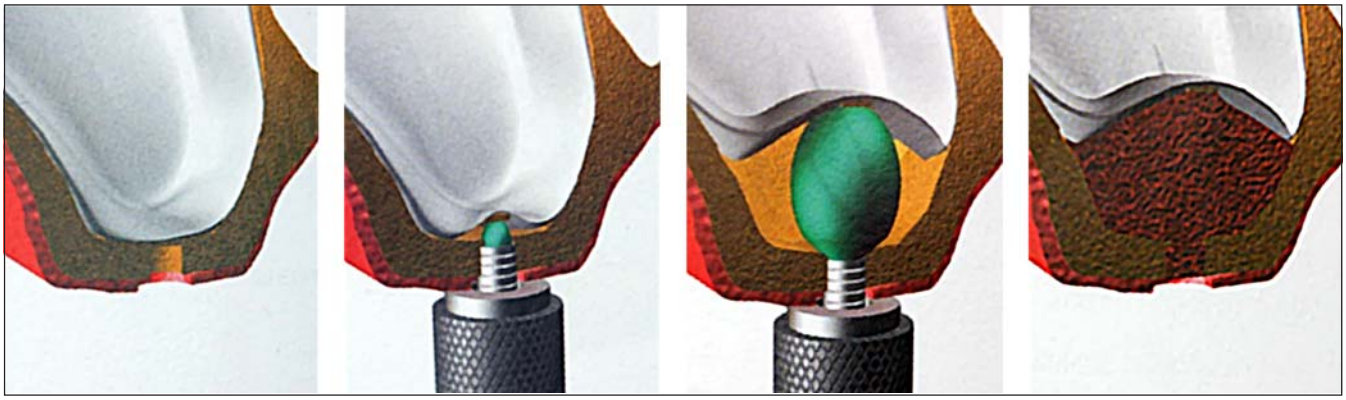

Fig. 5. The balloon sinuslift technique

Fig. 6. The balloon sinuslift set.

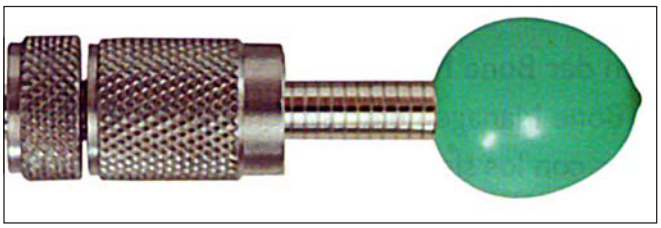

Fig. 7. The solution enters the balloon and pushes out the membrane.

Additional advantage of this method is that we know in advance the free space volume and the graft material volume we need.

Raising the floor of the sinus during extraction is a two-stage technique. (Fig.8) It's borrowed from classic Summers' technique, but it has limited indications. Raising the floor of the sinus through fracturing the interroot septum of upper molar after its extraction is possible, but relatively risky technique.

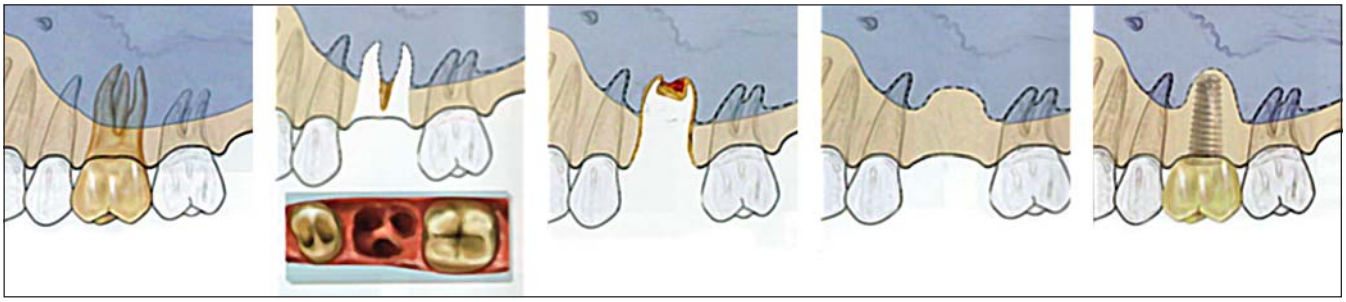

Fig. 8. Surgical protocol of sinus lifting during extraction of upper molar.

The hydropneumatic sinuslift is a crestal access technique, introduced in 2008 by Troedhan, A. Kurrek, M. Wainwright.The essence of this technique is that after the osteotomy with the pilot bur, reaching 2 mm from the sinus cavity, the hole is expanded to the sinus floor using calibrated diamond tips(Fig.9).Then, using a tip, called "Trumpet" , with a diameter equal to the diameter of the last instrument that expands the hole, a cooling solution is inserted from the piezosurgery unit and its hydrodynamic pressure pushes out the Schneider membrane.The grafting material is placed in the free space through the osteotome hole with the help of the "trumpet" and then the implant.

Fig. 9. The intralift piezotips.

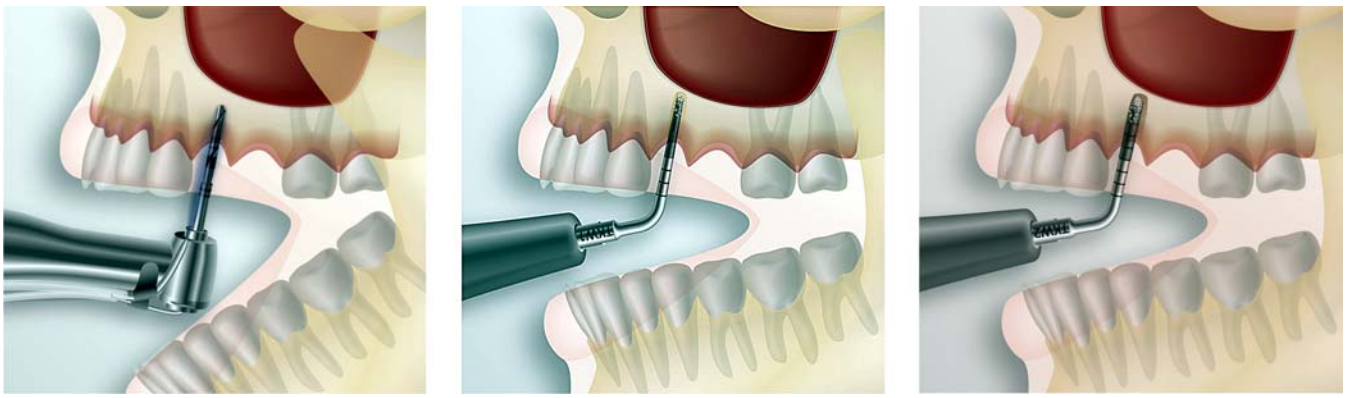

Fig. 10. The surgical protocol of intralift
a)Preparing of the pilot hole. b), c) Expanding of the hole.

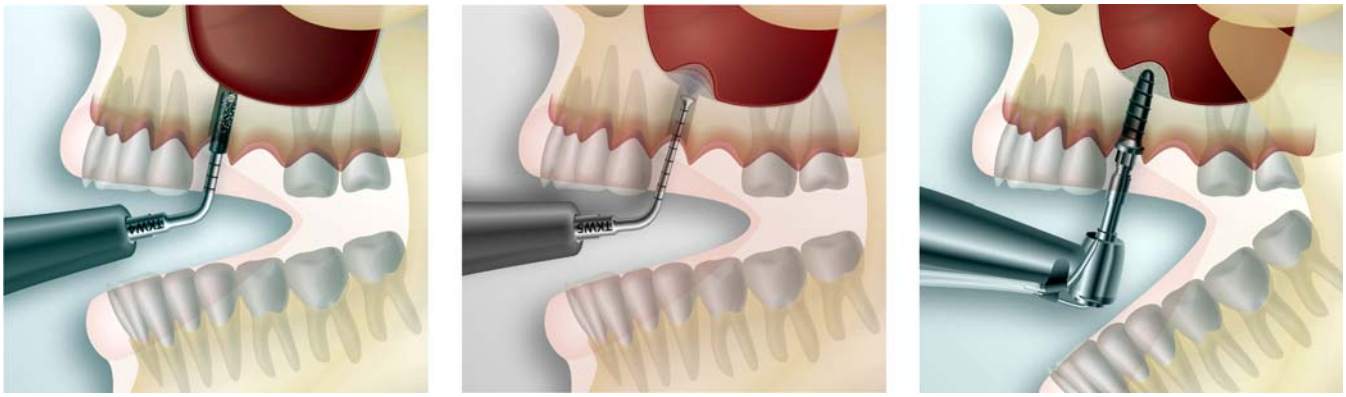

Fig. 10. The surgical protocol of intralift
d) Push out of the membrane. e) Dispersion of the graft.

Depending on the particular case, the bone hole is calibrated and the implant is placed in the bone. Failing to obtain primary implant stability, the adopted rules are observed and 6 months are waited before the implant is placed. A new CT is recommended for visualizing the results.

The question about the quantity of the grafting material is under discussion . According to several authors, small quantity of grafting material mixed with blood from the operative field is sufficient to maintain the required volume. There are authors who do not recommend the placement of any such material, relying entirely on the blood clot.

In all alternative sinuslift techniques are valid the general rules of sinuslift consensus conference of 1996. They specify the types of surgical techniques and combinations between them, according to three criteria:

Height of alveolar bone
- Width of alveolar bone
- Distance to antagonist teeth

The difficult classification adopted then, is simplified many times, including from bulgarian authors.(St.Peev)

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