5th Consensus on Treatment Modalities in Connection with the Maxillary Sinus

Preamble

The posterior maxilla often presents with reduced bone height and a pneumatized maxillary sinus. Two main approaches have evolved to support fixed dental prostheses in this region: bone augmentation («sinus lift») followed by conventional implants and cortical anchorage of implants without bone augmentation. This consensus document summarizes available knowledge on these modalities and provides recommendations.

Definitions & Classification

Maxillary sinus – an air-filled cavity lined by the Schneiderian membrane with a single natural ostium into the middle nasal meatus. Pathology can impair drainage and require sugical intervention.

Bone augmentation (sinus lift) – raising the sinus membrane via a lateral or crestal approach and insterting bone graft or substitute to increase vertical bone height before or during insertion of conventional endosseous implants.

Cortical anchorage (basal implants) – placement of implants that achieve primary stability by engaging cortical structures (e.g., sinus floor, nasal floor, pterygoid or zygomatic bone) without the need for bone augmentation; implants are polished and trans sinus segments are well tolerated.

Immediate loading – insertion of a fixed prosthesis within days of implant placement;

Conventional loading – loading after >= 8 weeks.

Indications Overview

Bone augmentation may be indicated when residual bone height is insufficient for primary stability of conventional implants and when patients accept longer treatment times and possible donor site morbidity. Cortical anchorage is indicated when immediate function is desired or augmentation is contraindicated; it requires sufficient cortical bone and cross arch splinting. ENT collaboration is indicated when sinus ventilation is compromised by mucoceles, polyps or foreign bodies.

Treatment Objectives

- Provide predictable and long lasting support for fixed prostheses in the atrophic posterior maxilla.
- Maintain or restore sinus health, including patency of the ostium and ventilation.
- Minimize patient morbidity, treatment duration and cost.

Consensus Statements

1 **Anatomy and pathology of the maxillary sinus**. The maxillary sinus enlarges throughout life and is lined by the Schneiderian membrane with cilia that facilitate self cleansing. Obstruction of the ostium by mucosal thickening, mucoceles, foreign bodies or tumours leads to secretion retention. Surgical enlargement of the ostium via endoscopic procedures or Caldwell–Luc fenestration restores drainage when conservative measures fail.

2 **Bone augmentation procedures**. Lateral or crestal sinus lifts using bone substitute materials or autogenous blocks can augment bone height and allow placement of conventional implants. Healing periods of 3–5“months only for the augmentation are typical. These techniques are associated with donor site morbidity, increased cost and delayed function.

3 **Cortical anchorage without augmentation**. Basal implants achieve osseofixation in cortical structures and extend into or through the sinus. Their polished intra sinus surfaces do not provoke granulation; however, primary stability must engage at least two cortices, and supplementary anchorage (nasal floor, tuberopterygoid or zygomatic bone) is recommended. Immediate loading of splinted restorations is feasible.

4 **Complications of implant penetration into the sinus**. Deep penetration (>2“mm) of rough surface implants into the sinus predisposes to polyposis and chronic inflammation, whereas polished basal implants protruding into the sinus are generally well tolerated. Nonetheless, restoration of ventilation and removal of foreign bodies is essential for long term health.

5 **Shift in practice**. Due to high failure rates and patient reluctance to accept bone augmentation, there has been a trend toward less invasive methods such as cortical anchorage. Patients increasingly demand immediate function reduced morbidity.

Clinical Recommendations

1 **Comprehensive treatment planning**. Before tooth extraction, clinicians should determine whether bone augmentation or cortical anchorage is appropriate based on residual bone height, sinus morphology, systemic health, aesthetic demands and patient preferences.

2 **Sinus lift indications**. Sinus lift procedures should be reserved for situations where other options cannot provide predictable outcomes. Surgeons performing these procedures should be trained and aware of potential complications. Simultaneous implant insertion is preferred when adequate primary stability can be achieved.

3 **Choice of implant design**. For cortical anchorage, use implant designs with polished shafts and cutting threads that engage cortical bone. Achieve multilateral anchorage (e.g., sinus floor plus nasal floor or pterygoid plate) and splint implants to distribute load.

4 **Management of sinus pathology**. In the presence of chronic sinusitis, mucoceles or foreign bodies, collaborate with ENT specialists to restore drainage. Remove residual roots or graft material from the sinus before implant therapy.

5 **Patient communication.** Discuss benefits, risks, expected treatment duration and alternatives with patients. Emphasize that sinus lift procedures extend treatment time and may require staged surgeries, whereas cortical anchorage can provide immediate function but demands strict compliance with postoperative instructions. In cases of strong atrophy in the mandible explain in detail the risk of paraesthesia developing after implant placement, and the benefits of a receiving a fully fixed dentition on Corticobasal® implants.

6 **Follow-up and maintenance**. After implant rehabilitation, monitor sinus health. Radiographic assessment should confirm that implants do not obstruct the ostium and that sinus aeration is maintained. Treat emergent sinus complications promptly.

Implications for Research

High quality randomized trials comparing sinus lift and cortical anchorage protocols with long-term follow up are lacking. Future research should evaluate patient reported outcomes, complication rates and cost effectiveness. Studies on safe penetration depths and the tolerance of polished implants within the sinus are encouraged.

Limitations

The above consensus is derived primarily from observational studies and of expert's opinion and deep insight. Evidence levels vary, and recommendations should be interpreted in light of individual patient circumstances and national regulations.

Disclaimer

These statements and recommendations are intended to guide clinicians in the management of implant therapy in the posterior maxilla. They do not replace clinical judgement. Clinicians should ensure they are adequately trained and should consult with specialists as required.

Literature

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