



Periodontology- Fifth stage



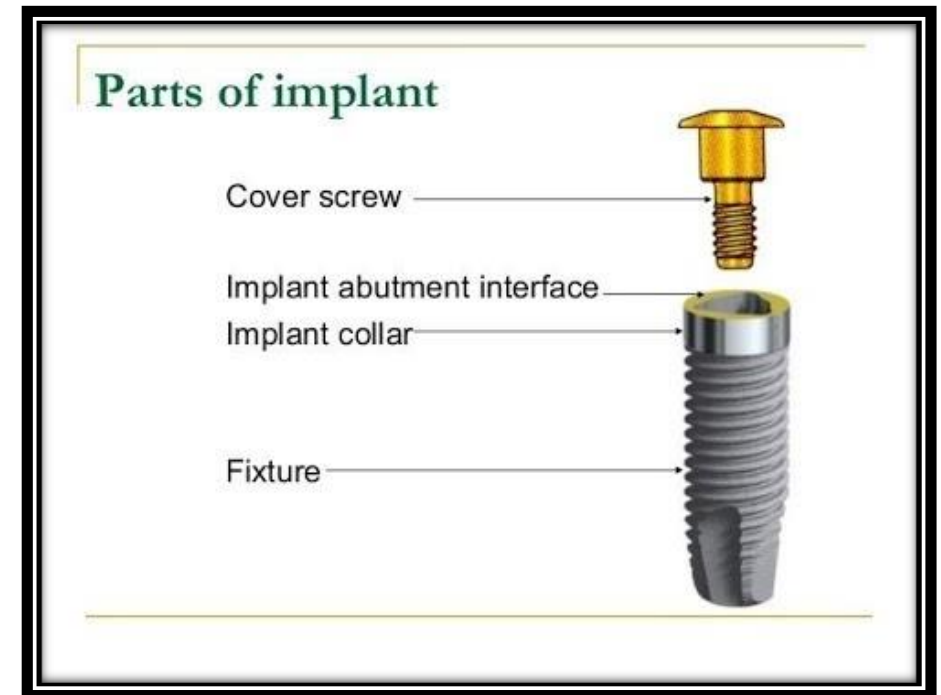
Second semester-Dental implant and peri-implantitis

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- **Dental implant** Dental implants are inert, alloplastic materials embedded in the maxilla and/or mandible for the management of tooth loss and to aid replacement of lost orofacial structures as a result of trauma, neoplasia and congenital defects. The most common type of dental implant is endosseous.

- **Implant components**

- Main components
 - a. Fixture
 - b. Abutment
 - c. Superstructure



Implant Geometry (Macrodesign)

1. Endosseous implants

- Blade like
- Pins
- Root form, cylindrical (hollow and full)
- Disk like.
- Tapered and screw shaped

2. Subperiosteal (custom frame) implants.

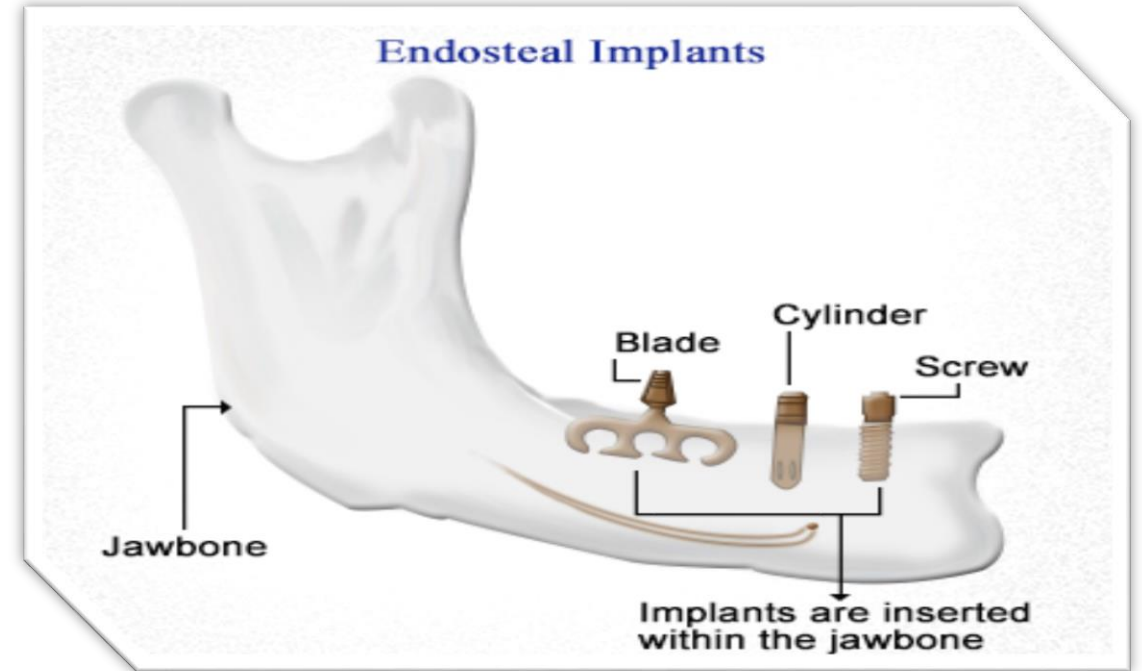
3. Transmandibular implants

Endosseous implants

- ❑ A device inserted into the jaw bone (endosseous) to support a dental prosthesis. It is the ‘tooth root’ analogue and is often referred to as a ‘fixture’.

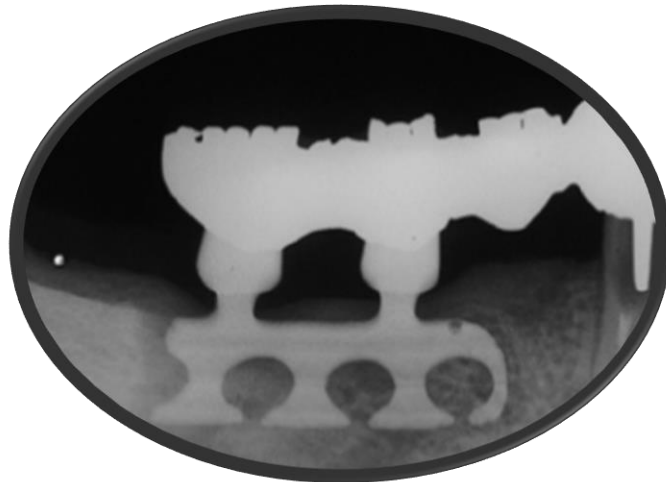
- **Root Form (Cylindrical) Implants**

The first implant in this category, designed and developed by Schroeder and colleagues between 1974 and 1985, was called an ITI (International Team for Implantology) hollow-cylinder, plasma-sprayed, one-stage implant.



Blade implants

- ✓ Blade implants were inserted into the jawbone after mucoperiosteal flap elevation and preparation of a channel with a high-speed rotary bur.



Blade form



Root form

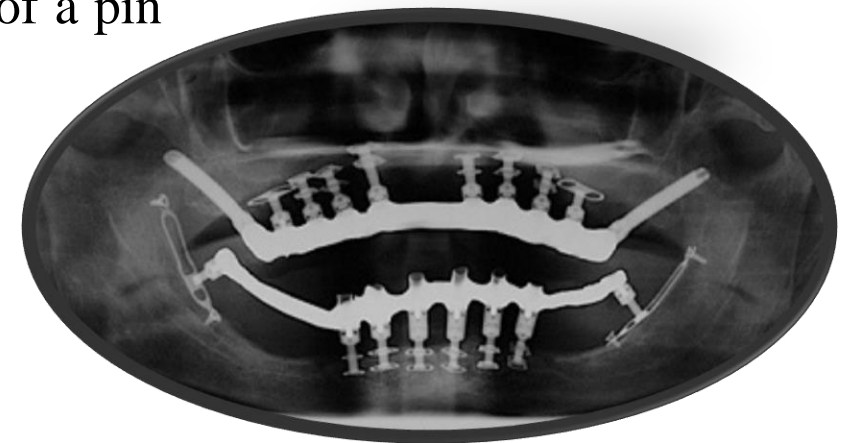


■ Pins

Although seldom used at present, in the classic technique, three diverging pins were inserted either transgingivally or after reflection of mucoperiosteal flaps in holes drilled by spiral drills.

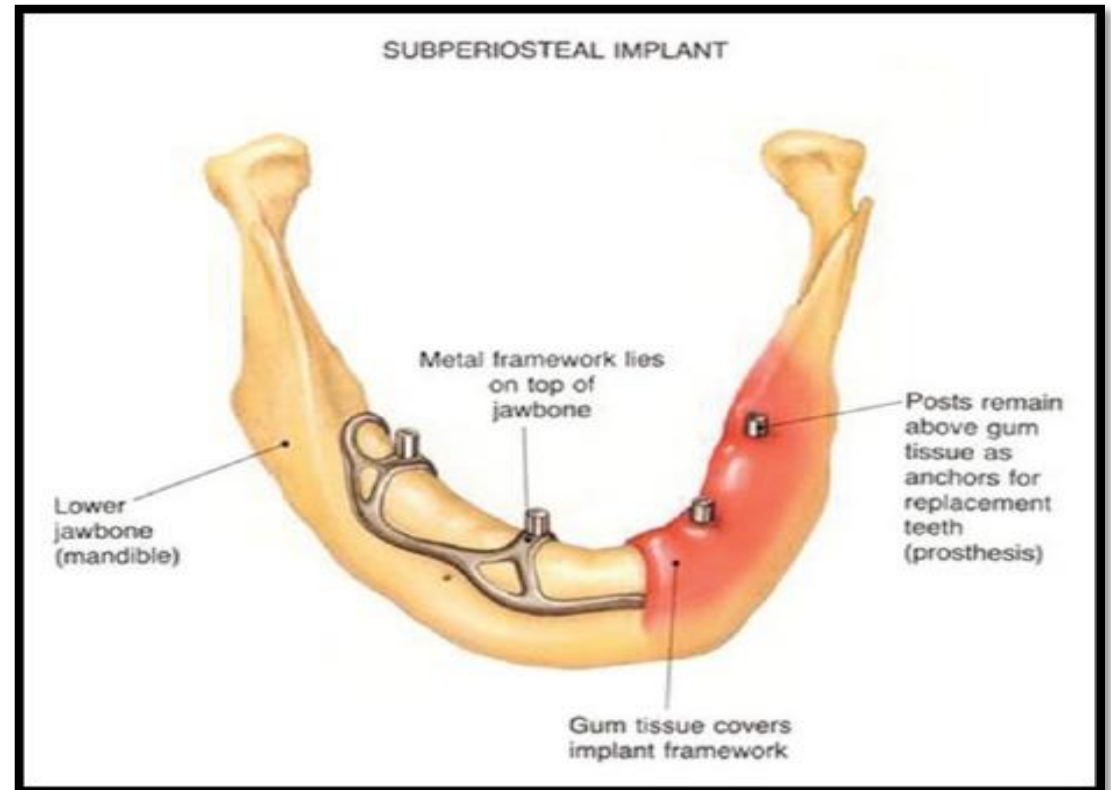
■ Disk Implants

Disk implants are rarely used at present. The concept developed by Scortecchi is based on the lateral introduction into the jawbone of a pin with a disk on top.



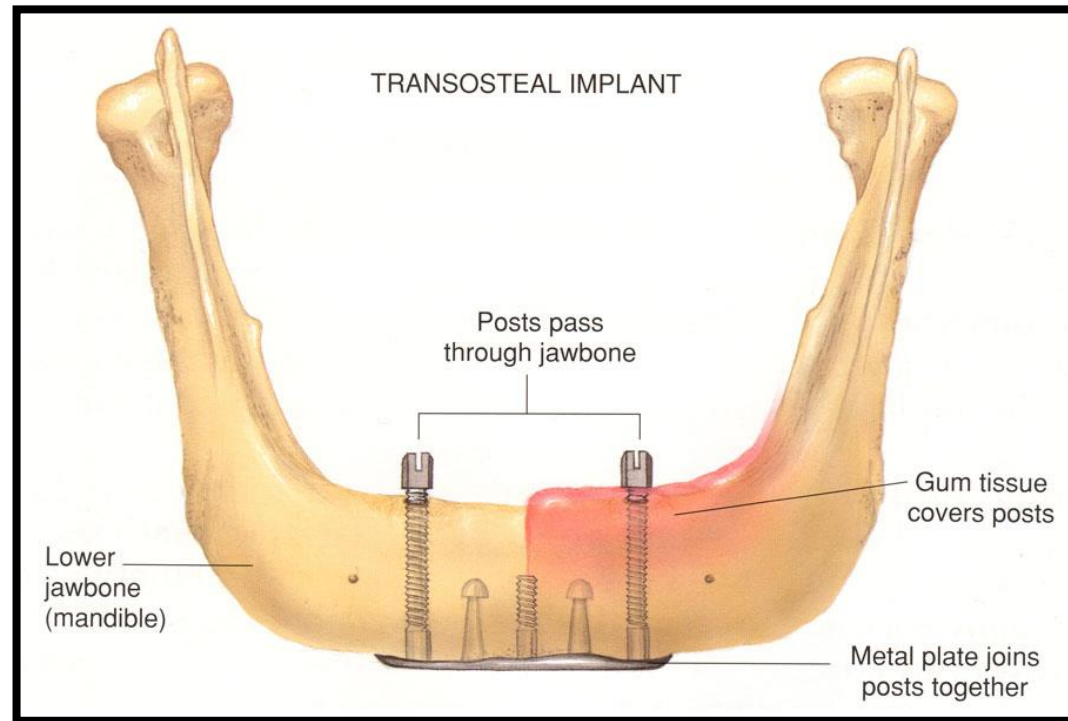
Subperiosteal (custom frame) implants

- ✓ Subperiosteal implants are customized according to a plaster model derived from an impression of the exposed jawbone, before the surgery planned for implant insertion. The implant was designed with several posts, typically four or more for an edentulous jaw, which passed through the gingival tissues.
- ✓ The subperiosteal implant was used in the treatment of atrophic mandibles.



Transmandibular implants

- ✓ Transmandibular implants were developed to retain dentures in the edentulous lower jaw. They were indicated for use in the extremely resorbed edentulous mandible with a minimal alveolar ridge height less than 10 mm.



Hard Tissue Interface

The primary goal of implant installation is to achieve and maintain a stable bone-to-implant connection (i.e., Osseointegration)

Histologically, osseointegration is defined as the direct structural and functional connection between ordered, living bone and the surface of a load-bearing implant without intervening soft tissues

Clinically, osseointegration is the asymptomatic rigid fixation of an alloplastic material (implant) in bone with the ability to withstand occlusal forces

Implant Surface Characteristics (Microdesign)

Implant surface characteristics (microtopography) have been shown to positively influence the healing process. Today, implants are treated with a variety of technologies to modify surface characteristics (microscale or nanoscale) to enhance bone formation.

Additive process

The additive process modifies the microstructure/macrostructure and chemical nature of the implant surface by adding materials or chemicals to the existing surface.

The addition of materials, such as hydroxyapatite to the implant surface has been shown to enhance or accelerate the initial bone cells, adaptation or proliferation.

Subtractive Processes

The subtractive process modifies the microstructure and chemical nature of the implant surface by removing or altering the existing surface.

Bone Remodeling

Clinically, both primary stability and secondary stability of an implant are critical to success.

- Primary stability, achieved at the time of surgical placement, depends on the implant geometry (macrodesign), as well as the quality and quantity of bone available for implant anchorage at a specific site.
- Secondary stability, achieved over time with healing, depends on the implant surface (microdesign), as well as the quality and quantity of adjacent bone, which will determine the percentage of contacts between the implant and bone.

For example, areas such as the anterior mandible have dense cortical bone and provide rigid primary stabilization and good support throughout the healing process. Conversely, areas such as the posterior maxilla have thin cortical bone, and large marrow spaces provide less primary stability. For this reason, the posterior maxilla has been associated with lower success rates compared with other sites with greater bone density and support.

Soft Tissue Interface

- There is greater interest in and appreciation for peri-implant soft tissues and the soft tissue-to-implant interface as a function of aesthetics and maintenance of a seal or barrier against microbial invasion.
- Hard and soft tissue anatomy around tooth and an implant demonstrates some similarities and some distinct differences.

Natural tooth

Bone support with a periodontal ligament

A connective tissue zone above the crest of bone with connective tissue fibers (Sharpey's) inserting into dentin

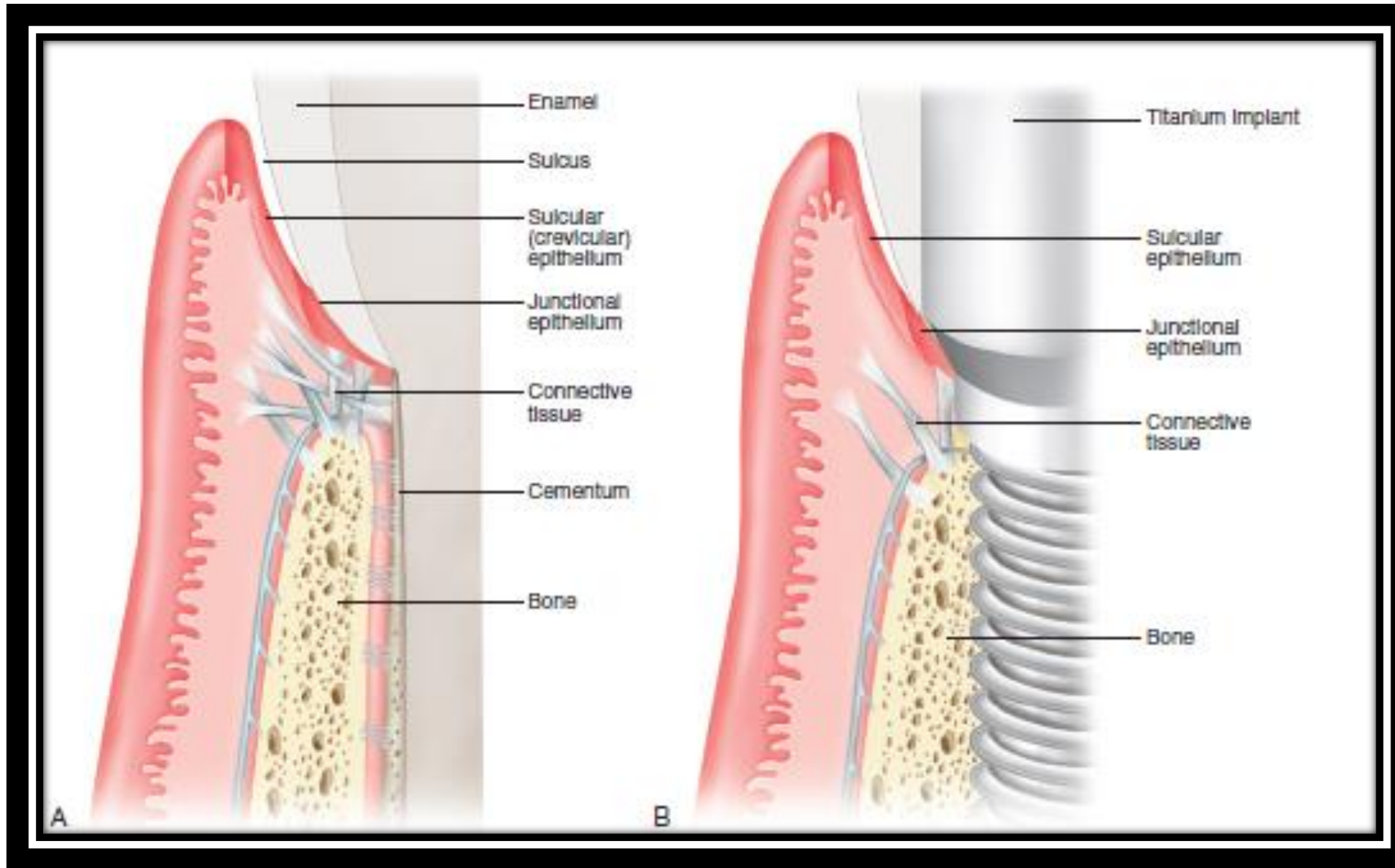
A long junctional epithelial attachment, a gingival sulcus lined with sulcular epithelium, and oral gingival epithelium (outer surface of gingiva).

Dental implant

There is supporting bone in direct approximation to the implant surface without any intervening soft tissues (i.e., no periodontal ligament)

A connective tissue zone is present above the level of bone with fibers running parallel to the implant surface and no inserting fibers

There is a long junctional epithelial attachment, a gingival/mucosal sulcus lined with sulcular epithelium, and oral gingival/mucosal epithelium (outer surface of soft tissue)



Schematic illustration of hard and soft tissue around a tooth and an implant.

Implant-Related Complications and Failures

Despite the high success and survival rates of oral implants, failures do occur and implant-supported prosthesis may require a substantial periodontal and prosthodontic maintenance over time.

Two common forms

- Peri-implant mucositis
- Peri-implantitis

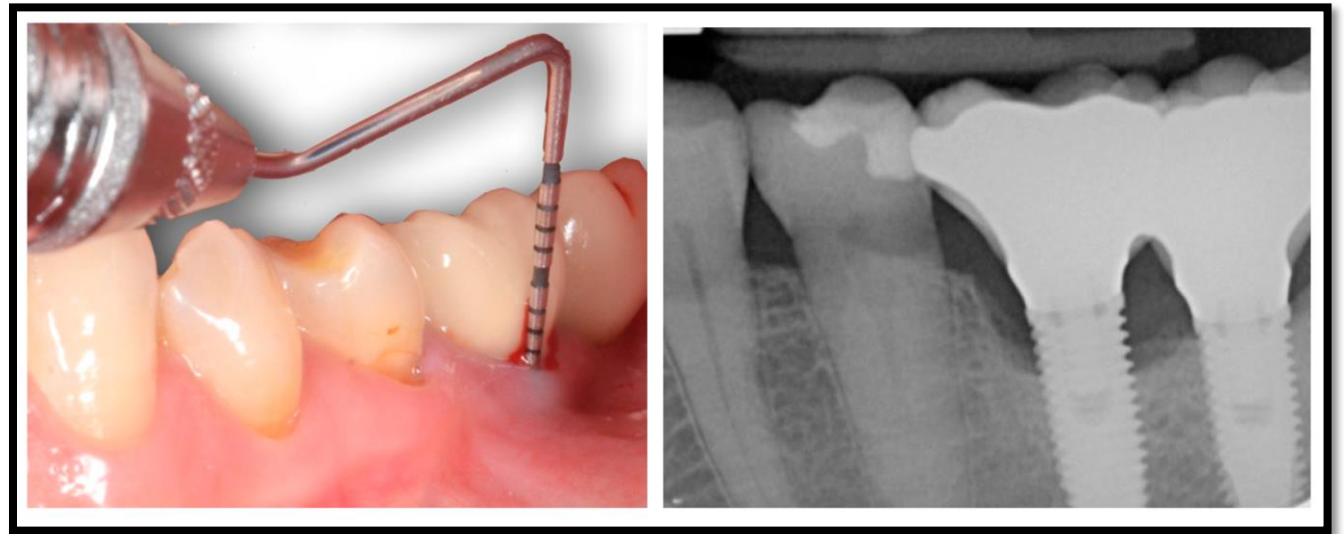
❖ **Peri-implant mucositis** : An inflammatory response limited to the soft tissues surrounding a functioning oral implant.



❖ **Peri-implantitis** is an inflammatory process that affects the tissues around an osseointegrated implant and results in the loss of supporting bone.

✓ **Workshop on Periodontology concluded that risk indicators for peri-implantitis included**

- (1) Poor oral hygiene,
- (2) History of periodontitis,
- (3) Diabetes,
- (4) Cigarette smoking,
- (5) Alcohol consumption,
- (6) Implant surface



Treatment of Peri-implantitis

Both surgical and non-surgical approaches have been evaluated for the management of peri-implantitis. The treatment approach employed is determined by probing depth and defect characteristics.

A non-surgical approach involves:

- Surface detoxification using mechanical, chemical, Lasers.
- Antibiotic therapy (locally and/ or systemically).

Surgical approaches include:

- Access flap.
- Resective and regenerative surgical technique.

Thank You!

