VIVA summary.

Surgery 1-4, 5th year.

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**Implantology 1-2.**

* Titanium is the material of choice for implants.
* It’s biocompatible, has high corrosion resistance and produces hypersensitivity, allergic or immunological reactions.
* Osseo-integration is the basis of a successful implant.
* It is defined as: (histologically) A direct structural and functional connection between ordered living bone and the surface of a load carrying implant.
* (clinically) A process whereby clinically asymptomatic rigid fixation of alloplastic materials is achieved and maintained in bone during functional loading.)
* Branemark was the first to place an implant in 1956.
* Implants success criteria:

1. Stability of the implant.
2. Adequate radiographic bone levels.
3. Lack of symptoms or evidence of infection.
4. Minimal probing depth around the implant.

* 95% overall success rate. The overall failure rate is twice as high in smokers than non-smokers.
* The most commonly used implant nowadays is Endosteal dental implant which is defined as: a device inserted into the jaw bone (endosseous) to support a dental prosthesis it is the tooth root analogue and often referred to as a fixture.
* Components of a dental implant:

1. Fixture: root-like structure inserted into bone.
2. Implant abutment: the component that attaches to the implant and supports the prosthesis.
3. Abutment screw: a screw used to connect the abutment to the implant.

* Types of abutments:

1. Transmucosal abutment: passes only through the mucosa.
2. Temporary healing abutment: used for the anterior region until definite abutment placement.

* Implant surgery:

1. Single stage surgery.
2. Two stage surgery. (most common) (Also called: submerge implant system.)

* Steps of the two stage surgery:

1. Inserted the implant beneath the mucosa.
2. Leave it for 3-4 months until osseointegration occur.

Note: mandible 3 moths , maxilla 4 months.

1. Then we will start with the second surgery and reopen it and remove the internal screw and place a gingival former instead of internal screw, gingival former will form a good adaptation of tissue around the implant.
2. Finally, take an impression post and place the prosthesis.

* We can classify the dental implants to:

1. Immediate placement: the implant is inserted immediately after tooth extraction (in the same socket). It is divided into:
   1. Immediate placement : at the same time
   2. Delayed immediate placement: after two weeks from the time of extraction.
   3. Delayed placement: after months or years from the time of extraction.
2. Immediate loading: attaching the prosthesis in the same time of implant insertion. (it’s considered as a provisional prostheses and you can't put heavy loads on it)

* Immediately placed implants have higher success rates than delayed implants ,but the problem is they are much harder to deal with and needs more clinical experience.
* In delayed placement all u have to do is to drill in the bone for a certain depth and diameter, but in a case of immediate placement u have to deal with the socket actual depth and diameter and sometimes you’ll end up doing bone grafts to fix the implant in a very wide socket.
* In case of a maxillary implant , you have to be very careful not to hit the maxillary sinus, as u know the maxilla is cancellous bone so if u hit it, negative pressure will be produced inside the sinus and this pressure can suck the implant into the sinus.
* Failure rate of implant is 3-5%.
* Bioactive implants (THE FUTURE): A device that allows the implant to bond to bone by chemical means. By using BONE MORPHOGENETIC PRITEINS "BMPS" on the surface of implants to enhance bone formation.
* The advantage is chemical bonding is that it’s rapid.
* Biomechanical implants (USED TODAY) bonds to bone gradually, as bone forms and invades implant surface irregularities.
* **Members of the treating team:**

1. Restorative dentist
2. Prosthodontist
3. Surgeon
4. Periodontist
5. Dental technician
6. Radiologist (**CBCT**>>>panorama), why CBCT? to calculate the amount of bone, if not enough bone , we do bone grafting)
7. Orthodontist(space management)

* **Treatment options :**

1. No treatment
2. Removable Prosthesis
3. Fixed Partial denture/fixed bridge
4. Dental implant- It is the best because it keeps/stops bone resorption, so inhibits wrinkles.

* **Patient selection criteria:**

1. Medical history:

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| --- | --- |
| **Relative contraindications** | **Absolute contraindications** |
| Controlled Diabetes | Uncontrolled diabetes |
| Anticoaugulants | Hemophilia |
| Smoking | IV bisphosphonates |
| Pacemaker | Drug abuse |
| Pregnancy (2nd trimester) | Some psychological disorders |
| Oral bisphosphonates |  |

1. Dental history:

Aggressive periodontitis

Multiple missing teeth

Bad OH

1. Prosthetic alternatives and options
2. Financial conditions (cannot afford)
3. Esthetic considerations: the most important region to place an implant is the anterior area.
4. Patient’s motivation for complex and sophisticated dental treatment, the operator must explain to the patient the steps of the procedure.

* **Intraoral Examination:**

1. Access : area of surgery must be feasible (limited mouth opening patients and patients with bruxism ,it’s very difficult to place implants for them.)
2. Prosthetic space : a lot of GPs don’t consider this thing ( overeruption of opposing )
3. Prognosis of the adjacent teeth : never place an implant when the adjacent is mobile , needs endo treatment or infected
4. Sizes and number of spaces
5. Bone volume, contour and orientation: we have to assess the bone by examination, probing and radiology.
6. Crown height
7. Status of the existing prosthesis
8. Biomechanical consideration ( bruxisim) : because these patient will increase the functional load on the implant > bone resorption > loss of implant
9. Oral hygiene and periodontal status

* **To evaluate the osseous contours:**

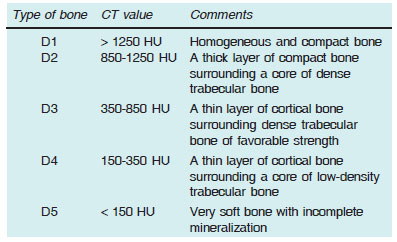
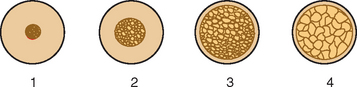
1. **-**Palpation of the undercuts or bony defects
2. -Mapping , give LA then use special probes, to check the width of the alveolus
3. -Radiographic examination using markers as GP cones to check the length
4. -Metallic spheres for standardization

* Implant :

1. **Length**: 6-16 ( 6 is the shortest and 16 is the longest),, **12** is the ideal
2. **Diameter:** as it is increased , better axial load distribution but cannot put large diameter in the anterior area… anterior zone= 2-3.5 max

Posterior zone=more than 3 (wider diameter)

1. **Shape**: hollow cylinder , solid cylinder, hole screw
2. **Type**: RTI/Nobel
3. **Surface characteristics**: depends if its machined and coated with hydroxyapatite , grit blasting , plasma spray , acid etching , bioactive implants.

* general rule : increasing the roughness > will increase the surface contact with the bone
* The CBCT: the inclination, parallelism, distance between the implants, minimum 2mm superior to the ID nerve / 5mm anterior to the mental foramen.
* **Surgical stint /surgical guide** (an impression and vacuum sheets are made**)**placed on the occlusal surface of the teeth, it gives us an accurate implant placement , predictable outcomes for occlusion , decreases the cost of expensive custom abutment because the angulation is calculated and prevents the fenestration because the orientation is right.
* **general rule** : implants are more successful in the mandible than the maxilla because of the cortical bone.
* **lekholm and Zarb bone classification**
* **Type 1>** anterior mandible
* **Type2>**posterior mandible **(best)**
* **Type 3>**anterior maxilla
* **Type 4>**posterior maxilla **(the worst because it** is cancellous bone that’s why implants may get into the sinus.
* During drilling the temperture musn’t increase above **47** degree >> because it will cause necrosis, Good irrigation is recommended.
* Take into consideration , smoking, infection, previous exposure to radiation, loading and esthetic

**IMPLANTOLOGY 3-4:**

Surgical phase: treatment planning:

1. Evaluation of the implant site clinically and radiographically
2. Bone height, width, and anatomical limitations
3. Surgical guide template
4. Preoperative planning can ideally be performed using 3D imaging . The latter is possible by using
5. Computed Tomography (CT)
6. Magnetic resonance imaging (MRI).
7. Cone beam computed tomography (CBCT), offering imaging at low dose and relatively lower costs.

Patient preparation:

1. L.A or sedation
2. Preop AB prophylaxis
3. Aseptic technique
4. Preop ChHx 0.12%
5. Facial preparation/ sterile technique
6. Self retaining cheek retractor

Preparation of the implant site:

1. Residual ridge irregularities
2. Low speed (1500-2000 rpm), high torque
3. Insertion at low rpm (15)
4. Implant site prepared by gradually larger burs
5. Use paralleling pin
6. For titanium implants, an uncontaminated surface oxide layer is necessary to obtain osseointegration
7. Non-threaded implants are positioned in place by tapping
8. Implant insertion

* 2 types of drills: Pilot drills and twist drills.
* Ant maxilla: implants slightly off midline avoiding incisive foramen
* Post maxilla: quality of bone, maxillary sinus.
* Implants 2 mm superior to the I.D canal / nerve repositioning
* Lingual depression under mylohyoid attachment
* Ant mandible: Implants placed at least 5mm ant to mental foramen
* 1 mm lingual bone, 0.5 labial/buccal
* Minimal distance between implants =3mm (7mm between implants centre for better emergence profile)
* 1mm of bone away from nasal cavity
* Post-op care:

1. Radiograph
2. Chlorhexidine mouthwash
3. Denture with a soft liner

* Stage II surgery:

1. Tissue punch
2. Crestal incision
3. Apically repostioned flap

* Advanced techniques:

1. Immediate placement of implants
2. Mandibular atrophy
3. Sinus lifting
4. Nerve repositioning
5. Implants in growing patients
6. Implants in irradiated bone
7. Guided tissue regeneration

* GTR

1. Membranes are Resorbable (Resolut, Vicryl, collagen sheets, lamelar bone sheets) or Non-resorbable (Goretex, titanium mesh)
2. should be placed larger than defect
3. can be fixed with pins
4. clear of adjacent teeth
5. wherever possible leave non-resorbable for 9 months at least

* Methods
* Local manipulation
* Extensive grafting (Bimax, free vascularised tissue transfer)
* Distraction osteogenesis
* Tissue engineering
* Ridge expansion and sinus lift could be indicated.
* Osteoconductive materials:
* Synthetic alloplasts usually ceramics, mainly Tricalium phosphate & Hydroxyapetite
* both are highly biocompatible and bond to bone

|  |  |
| --- | --- |
| HA | TCP |
| Good compressive but poor tensile strength  (similar to bone) | * More soluble * Partially resorbable   (rate equivalent to bone growth) |

P.S: you need to go back to the slides for the clinical photos, and some slides about tissue engineering.