

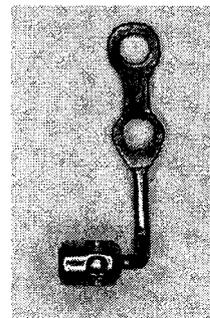
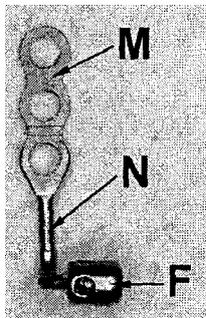
"Bollard" Skeletal Anchorage in Orthodontics

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INTRODUCTION

The bone anchors are used to increase orthodontic anchorage in the anterior or posterior region of the upper and/or lower jaw. A 2 or 3 holes titanium mini plate is fixed by monocortical mini screws. A neck (round bar with a diameter of 1.5 mm) is penetrating the soft tissues at the muco-gingival boarder. A cylindrical fixation unit with a blocking screw makes it possible to fix an auxiliary wire that connects the bone anchor with the fixed orthodontic appliance.

BOLLARD SYSTEM



The Bollard anchor: a 2 or 3 holes mini plate (M), a neck (N) and a cylindrical fixation unit (F) with blocking screw.

ORTHODONTIC INDICATIONS

- 1 Distal movement of the anterior segment in premolar extraction cases.
2. Distal movement of the posterior and anterior segment in non-extraction cases.
3. Mesial movement of posterior teeth.
4. Intrusion of a single tooth or a group of teeth.
5. Uprighting of mesialised lower second and third molars.
6. Preprosthatic orthodontics.
7. Loss of dental anchorage because of periodontal diseases.
8. Orthopaedic intermaxillary tractions.

CONTRA-INDICATIONS

Unhealthy soft and hard tissues in implant region, poor dental hygiene.

ADVANTAGES

1. Because of the skeletal anchorage no reaction forces on the teeth and no undesirable movement of anchor teeth.
2. Less compliance needed from the patient: the bone anchors replace auxiliary appliances such as headgear, inter maxillary elastics, Nance-appliance, Trans Palatal Arch, lingual arch ...
3. The fixation unit makes it possible to fix different auxiliary wires and change the point of application and the direction of the orthodontic forces.
4. The bone anchors are placed at a distance from the dento-alveolar region and don't disturb the movement of the neighbouring teeth.
5. No risk to damage teeth, nerves, growth centres or other anatomical structures.
6. Handling simplicity for the orthodontist: with 1 blocking screw anchorage can be easily switched on and off depending on the changing anchorage needs during the whole treatment.
7. The bone anchors are placed at the outside of the dental arch in the proximity of the fixed appliance. The forces are directly applied between the anchor and the orthodontic appliance.
8. No need to wait for osseointegration. Immediate loading is possible.
9. Thanks to the section of the round connection bar penetrating the soft tissues, dental hygiene is easy. This reduces to a minimum the risks for local infection.

INTRA-OPERATIVE APPROACH

All bone anchors are inserted under local anaesthesia with local sub-mucosal infiltration.

Four anatomical sites are used according to different orthodontic indications:

1. zygomatic buttress
2. nasal process of the maxilla
3. canine region of the mandible
4. molar region of the mandible

The zygomatic buttress and the canine region of the mandible, as shown in the step-by-step procedure, are the anatomical sites recommended for the majority of the orthodontic applications.

STEP-BY-STEP PROCEDURE

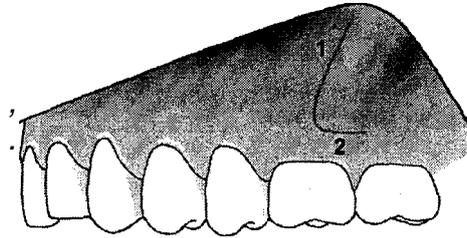


Fig 1 : In the maxilla an L-shaped incision is made with anterior convexity. The vertical part of the incision (1) is made ± 1 cm mesial from and parallel to the infra-zygomatic crest and up to 2 mm below the muco-gingival boarder. The incision is extended distally (2) with a horizontal incision 2 mm below and parallel to the muco-gingival boarder.

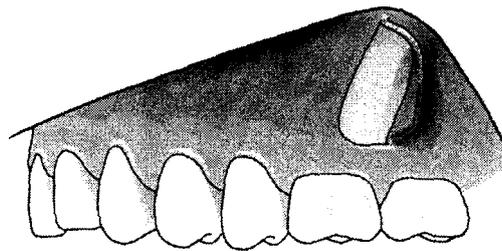


Fig 2 : A posterior based mucoperiosteal flap is made for bone exposure.

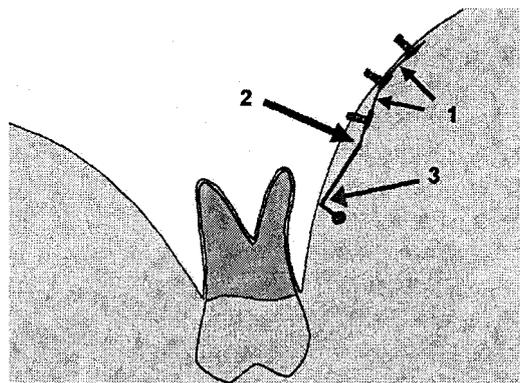


Fig 3 : The mini plate is slightly bended to obtain good contact to the cortical bone. The bending should be limited to the region between the holes (1) in the mini plate. The connection between the mini plate and the neck (2) should be slightly bended in the opposite direction to ensure good contact between the lower part of the neck and the alveolar bone (3).

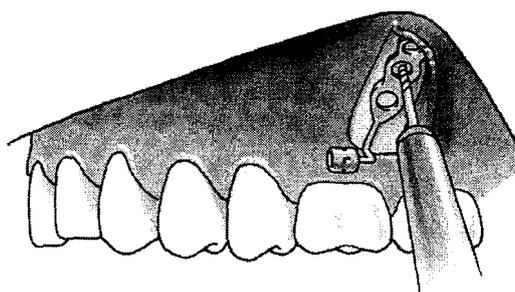


Fig 4 : The bone anchor is positioned so that the round connection bar of the neck penetrates the soft tissues exactly at the angle of the L-shaped incision 2 mm below the muco-gingival boarder. The centre of the holes in the mini plate should be an top of the infra-zygomatic crest. A first hole with a diameter of 1.6 mm is drilled through the middle hole of the mini plate.

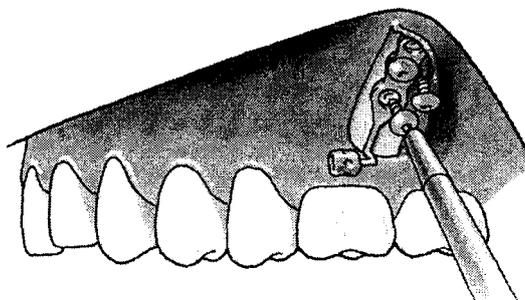


Fig 5 : The first screw is not completely fixed in order to allow some rotation of the mini plate. The lower hole is drilled and the mini screw is inserted, followed by the upper one and all are fixed for a strong stable retention.

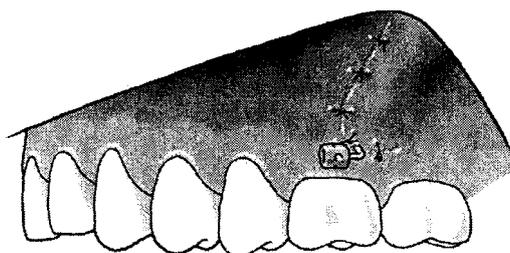


Fig 6 : After rinsing with saline solution, closure is obtained in one or two planes with 4/0 self resorbing sutures. The mucoperiosteal flap is positioned by the first suture just anterior from the neck of the bone anchor. Additional sutures are placed until good closure is obtained. The fixation unit should be oriented parallel to the alveolar bone with the blocking screw facing to the front.

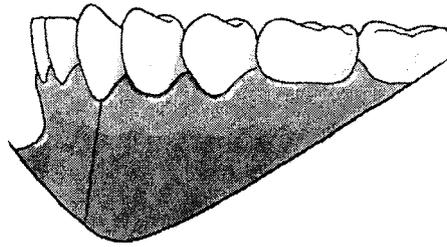


Fig 7 : In the mandible a horizontal full thickness incision is made into the gingival sulcus along the marginal bone starting in front of the second premolar extending mesially and including the distal papilla of the canine. Just before the lowest point of the gingival margin in front of the canine the incision is continued vertically and slightly forward.

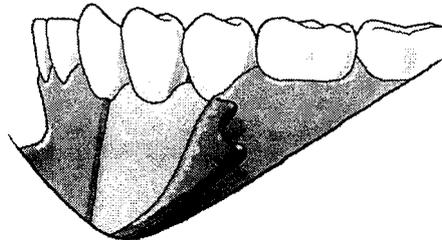


Fig 8 : A posterior based flap is made for bone exposure.

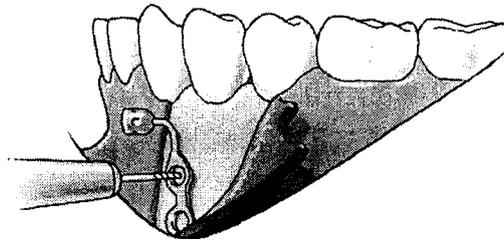


Fig 9 : The bone anchor is positioned parallel to and between the roots of the canine and the first premolar. The neck should penetrate the soft tissues exactly at the level of the vertical incision and 2 mm above the muco-gingival boarder throughout attached gingiva. The first hole is drilled in the inter-radicular space between the canine and first premolar at the level of the roots apices.

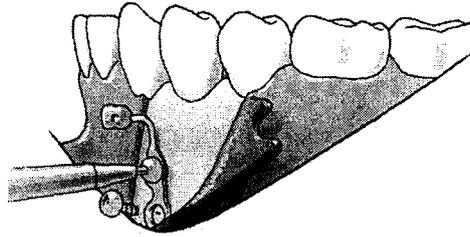


Fig 10: The first screw is inserted but not completely fixed to allow some rotation of the mini plate. The second screw is inserted in the mandibular body and both are fixed for a strong stable retention.

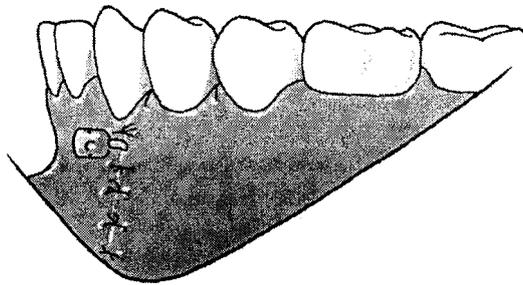


Fig 11 : After rinsing with saline solution, closure is obtained in one or two planes with 4/0 self resorbing sutures. Sutures are placed through both papilla and along the vertical incision.

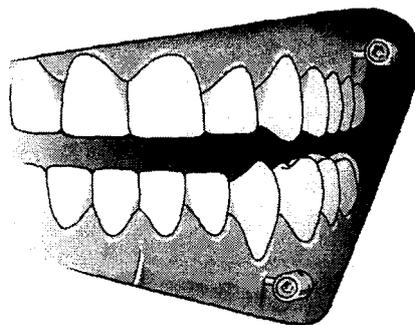


Fig 12: The fixation unit of the bone anchor should be oriented parallel to the alveolar bone with the blocking screw facing anteriorly.

RECOMMENDATIONS FOR THE ORTHODONTIST

- To reduce the risk for infections the placement of the bone anchor should never be combined with extractions of teeth.
- Removal of the remaining stitches and oral hygiene instruction with single tufted toothbrush 10 days after surgery.
- Continuous orthodontic loading is recommended 2 weeks after surgery. Therefore both arches should be orthodontically leveled before the placement of the bone anchor. The first month light forces are used.
- The blocking screw of the fixation unit should never be completely removed to open the vertical slot.
To unscrew the blocking screw, we recommend to use the screwdriver with reference number 99-911A.
- Elastic hooks and extensions are preferably bended in 0.032 x 0.032 stainless steel wire.
- The orientation of the fixation unit can be slightly changed by finger pressure. Local anaesthesia is not needed.
- The bone anchor should be removed when there is no more need for skeletal anchorage.

PATIENT INSTRUCTIONS

- Ice application immediately after surgery to reduce swelling of the soft tissues.
- Antiseptic mouth rinsing and gently brushing the region of the bone anchor the first week after surgery.
- Appointment with the orthodontist 10 days after surgery to remove the remaining sutures and for hygiene instruction.
- Appointment 2 weeks after surgery to start orthodontic loading.
- The patient should not touch the bone anchor with his tongue. These intermittent forces may be responsible for the loosening of the bone anchor some weeks after surgery.

GENERAL INSTRUMENTS

For the fixation, the following material is recommended:

70-105S	Monocortical titanium screw \varnothing 2.3 mm - L 5 mm
70-107S	Monocortical titanium screw \varnothing 2.3 mm – L 7 mm
99-901A	Screwdriver handpiece
99-909S	Screwdriver 1.4 mm internal pentagon
99-915S	Slotted screwdriver 3.5 mm

We recommend to use a stainless steel drill \varnothing 1.65 mm in the maxilla:

50-212W	Drill \varnothing 1.65 mm - stop 5 mm - L 50 mm
50-221W	Drill \varnothing 1.65 mm - stop 7 mm - L 27 mm

In the mandible, we recommend to use a stainless steel drill \varnothing 1.8 mm:

50-312W	Drill \varnothing 1.8 mm - stop 5 mm - L 50 mm
50-322W	Drill \varnothing 1.8 mm - stop 7 mm - L 50 mm

ORDERING DETAILS

02-031A Maxillary anchor LEFT bended (mini plate 3 holes)
02-033A Maxillary anchor RIGHT bended (mini plate 3 holes)

02-024A Mandibular anchor LEFT bended (mini plate 2 holes) 02-
026A Mandibular anchor RIGHT bended (mini plate 2 holes)

FURTHER INFORMATION

www.boneanchor.be