



Mini-Implant and Its Application in Multidisciplinary Cases



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Introduction

The development of temporary anchorage devices (TADs) extended the possibility for orthodontic movement. TADs include Dental implants, Palatal implants, mini-implants, mini-plate implants, etc.

In 1983, Eklud and Greakmore first introduced screws in clinical orthodontic, merely to create orthodontic anchorage. The most used TADs are miniplates and mini-implants.

Compared with traditional means of orthodontic anchorage, mini-implants provided simpler orthodontic mechanics, greater patient comfort, reduction of treatment time, no dependence on patient collaboration, and minor anchorage loss. Success rate have been reported 87.7% for mini-implants. Mini-implant, Microimplant and Microscrew implant are used alternatively in articles and pointed to the same devices.

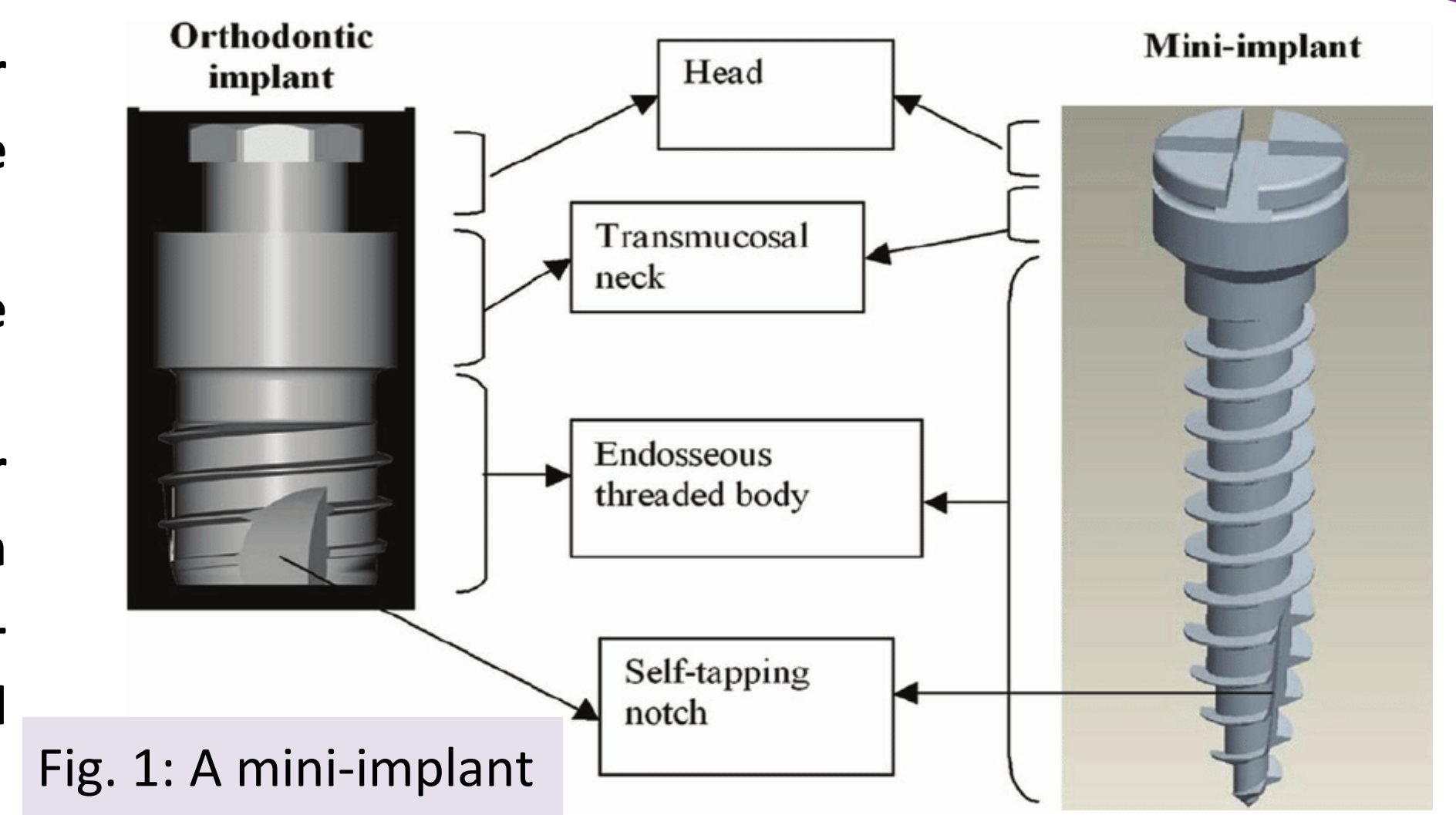


Fig. 1: A mini-implant

Selection and placement sites

The mini-implant is developed to provide easy placement and giving clinician options. Most microimplants which are used recently are made of titanium alloy, and minimal taper 0.1 from the neck to apex.

There is different types of head design for various situation based on tissue, attachments and function types.

Table 1	Common Placement Sites	Common diameter used
Diameters range from 1.3 to 1.8 mm at the neck		
	Maxillary alveolar bone between the teeth	1.3 mm
	Mandibular alveolar bone between the teeth	1.3 to 1.4 mm
	Retromolar area	1.3 to 1.4 mm
	Midpalatal area	1.4 to 1.5 mm
Diameters range from 5 to 12 mm in the length		
	Maxillary buccal area	7 to 8 mm
	Maxillary Palatal area	8 to 12 mm
	Mandibular retromolar, posterior teeth and anterior teeth area	5 to 6 mm
	Maxillary anterior teeth area	5 to 6 mm

Its application

Extrusion

Fig. 2: Patient undergoing orthodontic extrusion for the purpose of implant site development in the site #8. The #8 has been extruded utilizing a miniimplant placed apically. Case courtesy of Bill Ip, Newcastle Dental Hospital.



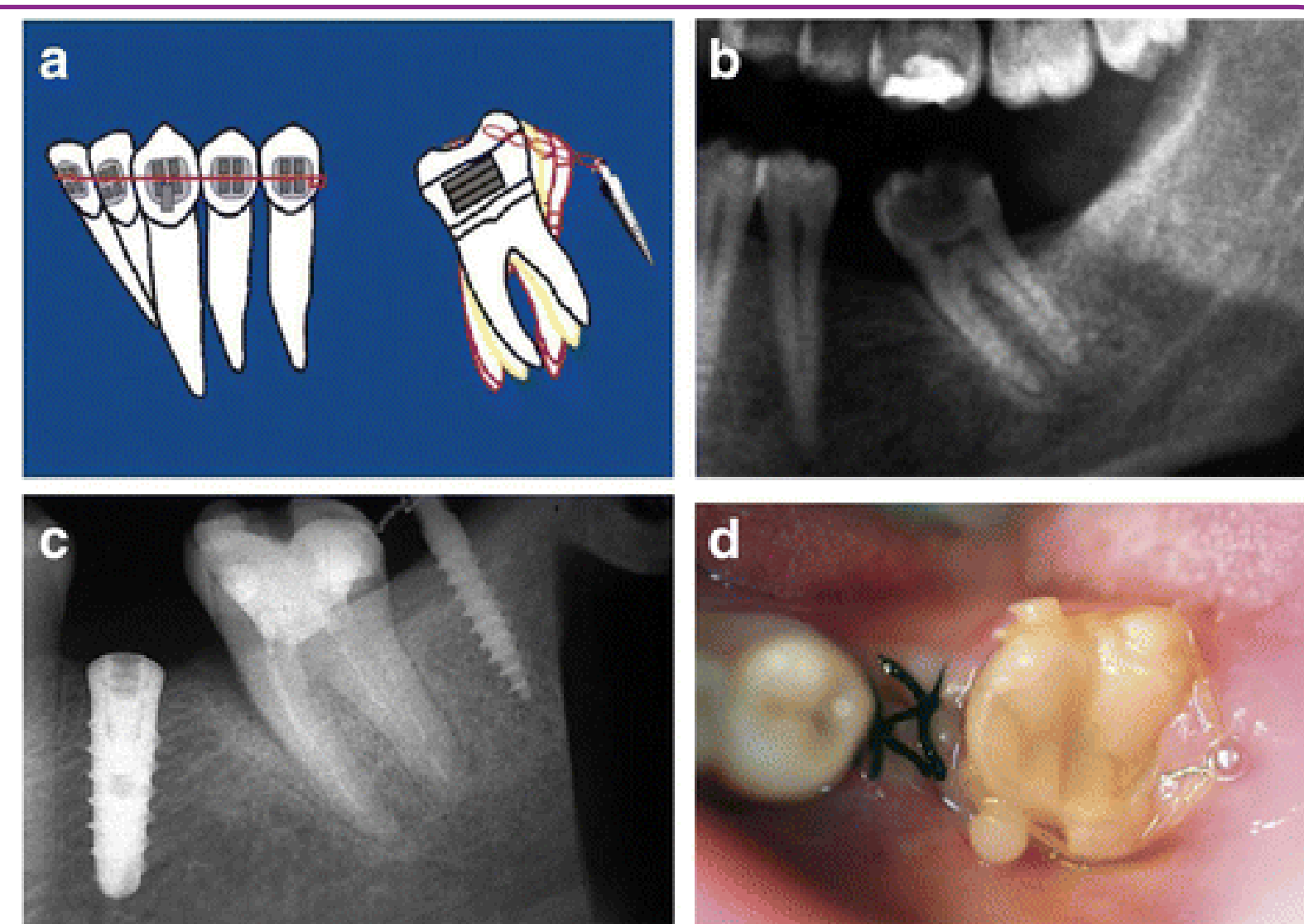
Intrusion

Fig. 3: a. Pretreatment clinical photograph showing supra-eruption of #14 and reduced CHS for prosthesis. b. Orthodontic mini-implant with E-chain with evident intrusion of #14.



Uprighting

Fig. 4: Uprighting of #18 with a miniscrew implant and elastomeric chain. a. A miniscrew positioned in the retromolar area with an elastomeric chain between the screw and the molar; uncontrolled tipping. b. Initial radiograph at the area of #18. c. Final radiograph after the uprighting of #18, with the miniscrew placed distally and an implant in the site of #19. d. Occlusal view of uprighted #18.



References



Placement procedure

There are self-tapping screws and a self-drilling screws which are suitable for the dense, thick, bone and for thin cortical bone area respectively. The drill method requires predrilling with a pilot drill before placement.

The drilling should be performed under irrigation with coolants. The diameter of the pilot drill should be smaller than the microimplant. After making a hole with the pilot drill, the microimplant can be introduced into the hole and tightened with a screw-driver.

Injection one-third to one fourth ampule of anesthetic solution into mucosa. This small amount preserves sensation in the periodontal ligament. If a pilot drill or microimplant impinges into the periodontal ligament, the patient may experience pain. This indicates root contact and allows the clinician to change the direction of placement.

Placing the microimplant into the nonattached gingiva, a small incision is necessary. There is no need to suture because the incision is less than 4 mm.

In anterior teeth area and maxilla, implant can be placed at a 30 to 40 degree angle to the long axis of the teeth. A study demonstrated that the 90° insertion angle is ideal for orthodontic micro-implants' stabilization.

Microimplants are removed by simply unscrewing them, without local anesthesia.

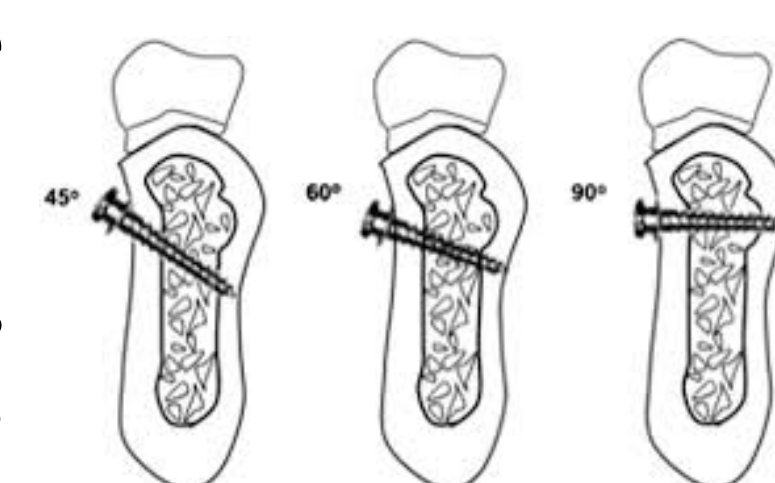


Fig. 5: different insertion angulation

Complications

Complications are divided into:

- 1- During placement: root contact, structural anatomy contacts
- 2- Under Orthodontic loading: Anchorage loss.
- 3- During and after removal: fracture, scar.