ECRONICON OPEN ACCESS

EC DENTAL SCIENCE
Case Report

The Use of the Extracted Tooth as a Surgical Guide for an Immediate Implant

Alexander Corsair D.M.D*

Private Practice Limited to Periodontics, 364 Merrick Road, Rockville Centre, New York, USA

***Corresponding Author:** Private Practice Limited to Periodontics, 364 Merrick Road, Rockville Centre, New York, USA.

Received: February 15, 2019; **Published:** April 08, 2019

Abstract

The use of surgical guides has been shown to be useful for the accurate placement of dental implants as opposed to free hand placement. This case report illustrates a new guided surgery technique using the extracted tooth as a guide. This new technique is indicated for immediate implants to replace single rooted teeth. There is no additional cost or materials involved when using an extracted tooth as a guide.

Keywords: *Guided Surgery; Osteotomy; Osseointegration; Proactive; Platform Switch*

Introduction and Case Report

Occasionally when an immediate implant is planned there is no time to construct a surgical guide. Sometimes the tooth to be extracted can be used as a guide (Figure 1a). If the tooth is in an ideal position for an implant and given that an immediate implant is indicated, here's how it is done. After extraction of the tooth the socket is cleaned and evaluated to insure that all 4 walls are intact. The height of the facial and lingual walls of the socket are recorded. The tooth is prepared in hand using a high speed hand piece and a surgical length, 25 mm long, fissure bur. An opening is made in the crown corresponding to the ideal emergence of the implant. For an upper anterior tooth, when planning a screw retained restoration, the opening would be in the cingulum area. A channel is then cut through the center of the crown going through enamel and dentin. If the plan is to prepare the osteotomy at the expense of the lingual bone then this bur will be directed toward the lingual. For a posterior tooth the cut is in the central fossa. Mid way through the cut, x rays are taken of the tooth extra orally from the buccal and from the inter proximal with the drill in place (Figure 1c). In this way the direction of the channel can be evaluated. If the direction is acceptable then the channel is continued 3 mm past the apex. (If the apex is curved then it would be removed immediately after the extraction). The tooth is x rayed again extra orally (Figure 1c) and then replaced in the socket and x rayed with the drill in place short of the apex (Figure 1d) If the x ray shows a good position of the drill then with the tooth replaced in the socket and stabilized, the osteotomy is done 3 mm past the apex into the bone. Since the high speed friction grip bur has a head diameter of 1.4 mm you will need to insert the bur several times before the channel within the tooth will accommodate the 2.0 mm diameter implant drill. Of course a preliminary measurement is made of the length of the tooth compared to the length of the drill so that a drill stop [1] can be used to limit apical penetration if necessary. Then an x ray is taken with a direction indicator in the extraction socket (Figure 1e). In some cases one may want to change direction. The change can be facilitated by removing a portion of the root. The surgical length hi speed drill is re inserted and the angle adjusted. The process is then repeated with the final drill diameter, 3.4 t mm drill for a 4 mm diameter tapered implant. An option is to use only the 2.3 mm implant drill with the tooth guide. Again, an x ray is taken with a direction indicator in place. If the location of the direction indicator is ideal then the implant is inserted. A final x ray is taken (Figure 1f). If the osteotomy is to be placed more to the lingual then a #8 round bur is used in addition to the fissure bur. The perforation in the cingulum is moved lingually and a channel is created along the lingual surface to the apex (Figure 2a, 2b

). The depth is 1 mm deep so preparation with a 2.3 diameter drill will create a 1.3 mm channel in the bone. The implant drill cuts the softer bone not the harder dentin. If the 24 mm long implant drill does not extend beyond the apex then the crown of the tooth is reduced until the drill extends 3 mm past the apex. The crown serves as a drill stop or a drill stop may be inserted [1]. If the tooth is tilted then

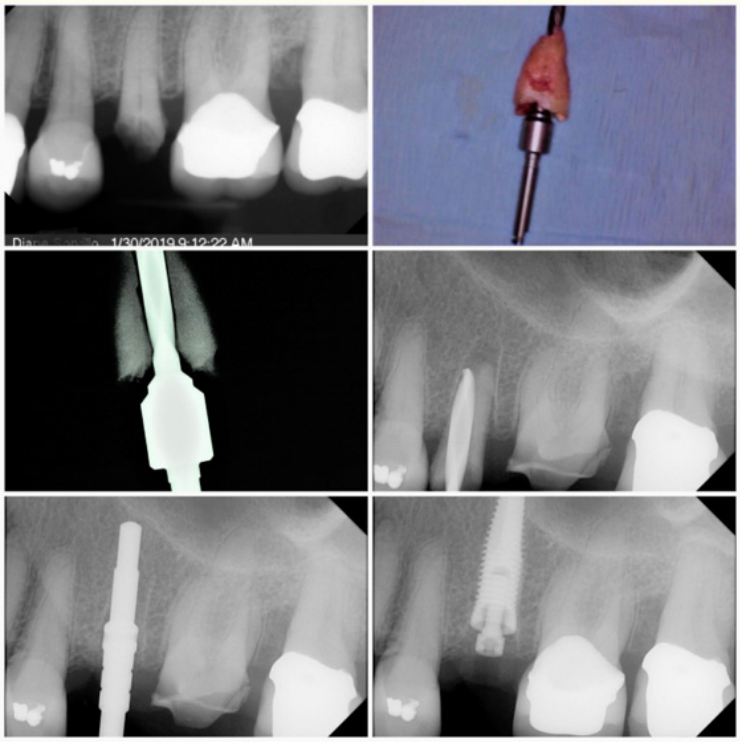

Figure 1a-1f: *a: X ray of hopeless tooth #13; b: Extracted tooth with drill in place; c: X ray extra oral; d: X ray tooth replaced in socket; e: Direction indicator; 1f: X ray of 4.0 x 13 T implant.*

the channel is moved to correct the direction. If the crown is short or absent then a drill stop may be used to limit apical penetration [1].

I prefer tapered implants especially in extraction sockets. I use a proactive surface. It is hydrophilic and attracts the blood clot and leads to more rapid osseointegration [3]. Using a platformed switched implant may also contribute to less bone loss during healing when the platform of the implant is located below the below crest [4].

In case #1 tooth #13 was unrestorable. Adequate bone was available to place an immediate implant 3 mm past the apex of this tooth. The tooth was extracted atraumatically. The socket was curetted, the buccal plate was intact and all criteria were met to allow for an immediate implant. The extracted tooth was prepared with a surgical length fissure bur. A channel was prepared starting with a hole in the occlusal corresponding to the ideal emergence location of the planned implant. The channel was cut to the apex angled toward the mesial since the root curved to the distal. Then the tooth was x rayed from both the distal and buccal extra orally with the bur in place. If acceptable then the tooth and bur are replaced in the socket and x rayed. If the angles are acceptable then the osteotomy is accomplished through the channel in the prepared tooth with a 2.0 or 2.3 mm implant drill with irrigation. A direction indicator is then placed in the socket and x rayed. If the spacing and angle is ideal the osteotomy may be completed free hand or the channel enlarged and the final drill, a 3.4 tapered drill, is used for the 4.0 x 13 tapered implant. Finally, the implant is placed to the floor of the maxillary sinus. Note the

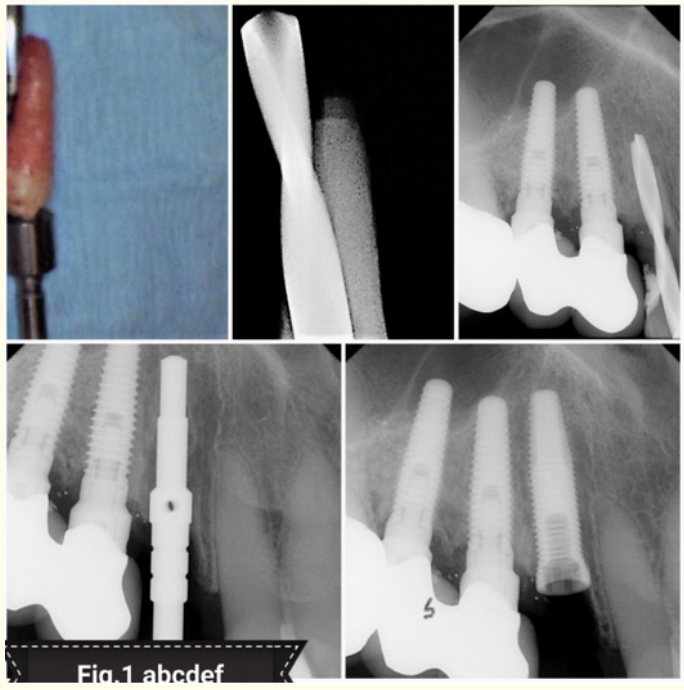

Figure 2a-2e: *a: Extracted tooth #6 buccal view drill extended to disto lingual; b: Extracted tooth x rayed extra orally to check angle; c: Tooth replaced in socket with drill to check angle; d: Direction indicator in place showing a good angle; e: 15 x 3.5 tapered implant in good position.*

implant in an ideal location for a screw retained implant supported restoration. A healing collar was placed. The patient was comfortable and healing well post operatively.

In case #2, tooth #6 was badly decayed on the distal and deemed to be unrestorable. The space from mesial to distal was 7 mm so implant placement after the extraction needed to precisely bisect the space. Doing this free hand would be unpredictable so the "tooth guided technique" was employed as described in case # 1. The difference here was that the channel was cut to the lingual so the implant would be separated from the buccal plate to avoid recession. The final x ray shows the 15 x 3.5 tapered implant in place.

Discussion

Surgical guides planned with CT scans and printed with tubes and used with guided surgery kits are state of the art. There are disadvantages: cost, time to plan and fabricate, inaccurate fit and difficulty fitting a drill through the sleeve [2]. The tooth guided technique allows precise placement of the implant at little additional cost and saves the patient time and money. Not all teeth to be extracted are candidates as they may be badly broken or in a poor location. Clinical trials need to be done to compare this new technique with free hand surgery and with guided surgery using tooth supported guides [2].

Conclusions

The use of an extracted tooth as a surgical guide for immediate implant placement is an expedient, useful and inexpensive technique when indicated. The extra oral preparation, inspection and x rays of the tooth/drill unit provides useful information regarding the planned implant. Free hand preparation of an osteotomy in an extraction socket can result in angulation errors. The re inserted tooth is stable in the socket and serves as a useful guide for an accurate osteotomy. The crown of the tooth also serves as a drill stop. Clinical trials need to be done to compare the accuracy of the "extracted tooth guided technique" with free hand surgery and CADCAM surgical guides.

Bibliography

1. Greenstein G., *et al*. "Using drill stops on twist drills to promote safety and efficiency when creating osteotomies for dental implants". *Journal of the American Dental Association* 145.4 (2014): 371-375.

2. Umapathy T., *et al*. "An Overview of Surgical Guides for Implant Therapy". *Journal of Dental Implants* 5 (2015): 48-52.

3. Sennerby L., *et al*. "Implant stability during initiation of periimplantitis: an experimental study in the dog". *Clinical Implant Dentistry and Related Research* 7.3 (2005): 136-140.

4. Atieh MA., *et al*. "Platform switching for marginal bone preservation around dental implants: a systematic review and meta-analysis". *Journal of Periodontology* 81.10 (2010): 1350-1366.

Volume 18 Issue 5 May 2019