Complications of Immediate Implant Placement and its Management: A Review Article

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Abstract:
As endosseous dental implant therapy rapidly becomes the prosthetic standard of care for a vast array of clinical applications, we are faced with the challenge of developing dynamic treatment planning protocols. An excellent technology of immediate implant placement is in the hands of today’s dentist world which means placement of an implant, immediately after the extraction of the tooth. Although immediate implant placement is associated with high success rates and survival rates, complications can occur. Complication sometimes is unforeseen, but it is urgent to identify and rectify them.

Key Words: Implant Placement, Complications, Tooth Extractions etc

Introduction:
The standard protocol requires at least 6 months before the placement of an implant in an extraction socket [1,2]. Immediate implant placement describes the placing of implants immediately into the sockets after tooth extraction [3]. Immediate implant placement is regarded as a viable technique, provided that proper patient selection and meticulous surgical procedures are adopted [4]. Clinical studies have demonstrated that the success rate of immediately placed implants is similar to that of implants placed after healing of extraction sites [5-7]. Placement of an immediate implant has the desirable effect of preserving alveolar bone width and height. Delayed implant placement may result in compromised esthetics and function due to lingual placement of the implant [8,9]. Hence, in certain circumstances, immediate implants will provide for more ideal prosthetic placement and will optimize esthetics, all via the preservation of bone. Few studies, however, systematically have addressed the frequency or natural history of complications related to the use of dental implants [10-13]. So is the fact with immediate implant placement. The most common complications associated with immediate implant placement are poor 3-dimensional implant positioning, inadequate band of keratinized tissue, gingival recession, unacceptable esthetics, and implant failure because of surgical trauma, contamination of the surgical field, premature loading, implant design, anatomic limitations such as quality and quantity of bone, systemic factors, and unknown factors [14].

The aim of this article is to summarize complications associated with immediate implant placement and its prevention.

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Prevention of complications associated with immediate implant placement:

**Recession:** Absence of keratinized gingiva around the dental implant affects the success of an implant. Peri-implant mucosa lacks keratinized epithelium at the base of the sulcus, which forms the junctional epithelium and has a hemidesmosomal attachment and internal basal lamina in the lower regions of the interface. It adheres poorly to implant surfaces, is more permeable and has a lower capacity for proliferation and regeneration. Recession can be avoided and the long-term stability of the mucosal tissue around the implant can be ensured by the use of adjunct soft tissue grafting.

**Poor quality and insufficient quantity of bone:** Implant failure rates are higher when the quality and quantity of bone at the implant site are insufficient. Packing of bone graft particulates and simultaneous use of osteotome transforms very spongy bone into dense bone. The early phase of bone regeneration at grafted sites is dominated by active bone resorption and formation throughout the graft. The latter phase of incorporation is characterized by osteoconduction and formation of a bone interface. Osteoinduction is also an influencing factor to synthesize new bone during first weeks.

**Surgical trauma:** Overheating the bone during preparation of the implant osteotomy site can lead to necrosis of the bone tissue surrounding the dental implant. Clinician’s skill is an important factor in the successful outcome of dental implants. Overheating the bone should be avoided by using copious irrigation and periodic replacement of twist drills to ensure sharpness. The implant manufacturer’s guidelines for drilling speed should be followed, and low hand pressure is warranted during high speed drilling in dense bone.

**Infection:** Strict antiseptic protocol should be followed during surgical implant placement. Premedication with broad-spectrum antibiotics is recommended. Thorough debridement of contained infection in the extraction socket and excavation of all of the soft and granulation tissues are necessary. In cases of acute diffuse infection, delayed implant placement is recommended.

**Violation of anatomic structure:** The availability of 3 to 5 mm of bone past the apex of the root is often necessary for primary stability and is helpful for avoiding the violation of surrounding anatomic structures. The implementation of a vertical sinus lift with an osteotome and the placement of a wide-neck implant decrease the likelihood of introducing an immediate implant into the maxillary sinus cavity. Obtaining cross-sectional radiographic images for locating the maxillary sinus, the nasal cavity, the inferior alveolar canal, and the lingual undercut (submandibular fossa) is helpful for avoiding the violation of these anatomic structure because it ensures at least 2 mm of clearance between the implant apex and the surrounding structures.

**Fenestration and dehiscence:** The complications of fenestration and dehiscence have been reported to occur after immediate implant placement [19]. The most common area for fenestration during the immediate implant placement are the maxillary anterior and premolar sockets. The socket apex can be more facially oriented and is frequently misleading during the initiation of the osteotomy preparation. A round bur positioned off center toward the palatal side and along the alveolar ridge angulation reduces the chance of fenestration of facial plate of the alveolar ridge. When these complications occur, spontaneous bone regeneration may be possible; however, in some cases, delayed implant placement is advisable [20,21]. For managing fenestration or dehiscence, a resorbable or non-resorbable membrane can be used with or without bone particulate from various sources [22,23].

**Implant stability:** Primary stability and success of implants are more likely when implants are supported by cortical bone. Biocortical anchorage is associated with some complications, but it results in good primary stability and better distribution of loading forces than monocortical anchorage [14].

**Malpositioning of implant:** Restoration-driven implant position must be correct in 3 dimensions for optimal functional and esthetic outcomes. Correction of integrated malpositioned implants is difficult and limited to prosthetic correction; otherwise, removal of the implant is warranted [14].

**Unesthetic outcome:** Tissue alterations leading to recession of the facial mucosa and papillae are common after immediate placement [14]. Indicators of risk of recession after immediate placement include a thin tissue biotype, a facial malpositioning of the implant, and a thin or damaged facial bone wall. A history of chronic periodontitis is an indicator of risk of lack of survival of postextraction implant [24,25]. In studies with observation period of 3 years or longer, approximately 20% of patients who underwent immediate implant placement and delayed restoration experienced suboptimal aesthetic outcomes because of buccal soft tissue recession [26]. For optimal esthetic outcome and limiting of buccal mucosal recession, Tarnow and colleagues recommend placing a bone graft and contoured healing abutment or provisional restoration at the time of flapless implant placement in a post extraction socket [27].

**Conclusion:**

Overcoming barriers to public utilization of immediate implants will greatly depend on our ability as dentists to appropriately select cases and deliver treatment in a timely and cost-effective manner. Proper case selection of immediate implants helps to deliver good success rates and minimizes treatment cost, time and complications.
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