**Critically Appraised Topic (CAT)**

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| **Project Team:**  |
| **4A-1** |
| **Project Team Participants:**  |
| **Luke Weston, Nicole Reitz, Grant Karlsson Ellifson, Elise Austin** |
| **Clinical Question:** |
| **In what situations can immediate implants be considered?** |
| **PICO Format:** |
| **P:** |
|  **Patients that need implants**  |
| **I:** |
| **Immediate implants** |
| **C:** |
| **Traditional implants** |
| **O:** |
| **Success and survival rates** |
| **PICO Formatted Question:** |
| **For patients that need implants, when do immediate implants have comparable success rates, as well as survival rates, to traditional implants?** |
| **Clinical Bottom Line:** |
| **Our patient presents with compromised #7 and #8 that may be indicated for immediate implant placement. While immediate implants are an attractive option because they reduce treatment time and surgical appointments, studies show immediate implants have significantly higher risk of failure than conventional implants. When patients meet specific criteria and thoughtful treatment planning is considered, immediate implant placement may be indicated. It’s important to identify the criteria that indicate immediate implant placement to minimize risk of failure and maximize successful treatment outcome for our patient.**  |
| **Date(s) of Search:**  |
| **October 19th, 2020**  |
| **Database(s) Used:** |
| **PubMed for National Institutes of Health** |
| **Search Strategy/Keywords:** |
| **Immediate implant placement, delayed implant placement, success rates, survival rates**  |
| **MESH terms used:** |
| **Dental Implantation, Endosseous; Dental Implants, Single-Tooth; Randomized Controlled Trials; Humans; Treatment Outcome**  |
| **Article(s) Cited:** |
| 1. Chrcanovic BR, Albrektsson T, Wennerberg A. Dental implants inserted in fresh extraction sockets versus healed sites: a systematic review and meta-analysis. J Dent. 2015 Jan;43(1):16-41. doi: 10.1016/j.jdent.2014.11.007. Epub 2014 Nov 26. PMID: 25433139.
2. Lang NP, Pun L, Lau KY, Li KY, Wong MC. A systematic review on survival and success rates of implants placed immediately into fresh extraction sockets after at least 1 year. Clin Oral Implants Res. 2012 Feb;23 Suppl 5:39-66. doi: 10.1111/j.1600-0501.2011.02372.x. PMID: 22211305.
3. Koh RU, Rudek I, Wang HL. Immediate implant placement: positives and negatives. Implant Dent. 2010 Apr;19(2):98-108. doi: 10.1097/ID.0b013e3181d47eaf. PMID: 20386212.
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| **Study Design(s):** |
| 1. **Systematic Review**
2. **Systematic Review**
3. **Narrative Review**
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| **Reason for Article Selection:** |
| 1. **This article was selected because it assesses the failure rate, marginal bone loss and postoperative infection between implants placed in fresh extraction sockets (immediate) versus healed sockets (conventional). It comes from a credible source, provides a high level of evidence, and I liked how it was formatted.**
2. **This article was selected because it examines the survival and successs rates of immediate implant placement over a mean follow up time of 2 years. This article is a systematic review and high level of evidence, but it does not compare success and survival rates to that of traditional implants. It provides more insight on success of immediate implant placement, which directly relates to our clinical question.**
3. **This article was selected because it provides indications for when immediate implant placement should be considered. While it is a narrative review and hence a lower level of evidence, it more directly answers our clinical question.**
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| **Article(s) Synopsis:** |
| 1. **This systematic review assessed failure rates of immediate implants compared to conventional implants. 73 studies were analyzed and found that immediate implant placement significantly affects implant failiure rates. The review discussed many factors to consider when placing immediate implants. Adequate hard tissue is necessary to achieve primary stability. Primary stability can be achieved by having implants engage 3-5mm of apical bone or using fixtures wider than the alveolus. 4-5mm of bone width and 10mm of bone height are necessary to achieve the above conditions. The effects of periodontal disease on immediate implant survival is unclear. Prosthetic rehabilitation also significantly affects implant surivival with single crowns having worse survival than full arch prostheses. Immediate loading also increases failure compared to conventional loading. Ideal implant placement is critical for success. Implants should be placed 1mm below alveolar crest, have 1.5mm of bone mesial and distal to implant and be lingually positioned with 2mm of buccal bone. There was no difference in immediate versus conventional implant failure based on arch or when full arch prostheses were used. Furthermore, no differences in marginal bone loss and post-operative infection were found between conventional and immediate implants.**
2. **This systematic review assessed success and survival rates of only immediate implants. 46 prospective studies were included in the review with a mean follow up of 2.08 years. The annual 2 year survival rate of immediate implants was 98.4%. Survival rates were analyzed by five discrete variables: antibiotics, reasons for extraction, maxillary vs. mandibular implant site, anterior vs. posterior implant site, and loading. Antibiotic regimen was the only variable that significantly affected survival rate with single dose pre-operative antibiotics having the greatest failure rate and a combination of single dose pre-operative with 5-7 day post-operative antibiotic regimen having the lowest failure rate. The four other variables did not significantly affect immediate implant survival. Immediate implant success was defined by “absence of any biologic, technical, and aesthetic complications” and assessed using studies with mean follow up times of at least 3 years. Biologic complications included peri-implant mucositis in 80% of subjects and peri-implantitis in 28% of subjects. Technical complications included implant abutment loosening in 9.8% of subjects, however this was only found in one study. Aesthetic complications included buccal soft tissue recession in 20% of subjects, which is closely associated with thin biotype and buccally positioned implants. The review did not state whether immediate implants were considered successful, however based on their definition of implant success I conclude immediate implants have limited success. Overall, immediate implants can be successful if cases are selected carefully and thoughtful treatment planning is considered.**
3. **This narrative review compiles information from Pubmed articles and offers suggestions about the positives and negatives of implant placement that clinicians can use as guidelines. This review outlines indications, contraindications and considerations for immediate implant placement. Immediate implant placement is indicated when patients are systematically healthy, have adequate soft and hard tissue, intact buccal plate and thick biotype. Immediate implant placement is contraindicated when patients have complicated systematic diseases, involvement of anatomic structures i.e. maxillary sinus, history of bisphosphonates, history of periodontal disease, no intact buccal plate and thin biotype.**
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| **Levels of Evidence:** (For Therapy/Prevention, Etiology/Harm) See <http://www.cebm.net/index.aspx?o=1025>[x]  **1a** – Clinical Practice Guideline, Meta-Analysis, Systematic Review of Randomized Control Trials (RCTs)[ ]  **1b** – Individual RCT[ ]  **2a** – Systematic Review of Cohort Studies[ ]  **2b** – Individual Cohort Study[ ]  **3** – Cross-sectional Studies, Ecologic Studies, “Outcomes” Research[ ]  **4a** – Systematic Review of Case Control Studies[ ]  **4b** – Individual Case Control Study[ ]  **5** – Case Series, Case Reports[x]  **6** – Expert Opinion without explicit critical appraisal, Narrative Review[ ]  **7** – Animal Research[ ]  **8** – In Vitro Research |
| **Strength of Recommendation Taxonomy (SORT) For Guidelines and Systematic Reviews**See article **J Evid Base Dent Pract 2007;147-150**[x]  **A** – Consistent, good quality patient oriented evidence[x]  **B** – Inconsistent or limited quality patient oriented evidence[ ]  **C** – Consensus, disease oriented evidence, usual practice, expert opinion, or case series for studies of diagnosis, treatment, prevention, or screening |
| **Conclusion(s):** |
| Based on the evidence, immediate implant placement may be considered when the patient meets certain criteria. If the patient presents with adequate bone volume (10mm bone height, 4-5mm of bone width, 1.5mm bone mesial and distal), 3-4mm apical bone engagement, thick (2.0mm) buccal plate, thick biotype and adequate soft tissue. Other factors to consider are prescribing pre- and post-operative antibiotics and refrain from immediate loading. Based on the reviewed studies, immediate implants have good survival rates and guarded success rates based on biological, technical, and aesthetic complications.  |