**Critically Appraised Topic (CAT)**

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| **Project Team:**  |
| **Carly Kirkpatrick (myself)****Joel Ledvina****Hanna Anderson****Anna Langworthy** |
| **Project Team Participants:**  |
| **Dr. Brunner** |
| **Clinical Question:** |
| **When can you safely recommend immediate implant placement?** |
| **PICO Format:** |
| **P:** |
| **Healthy adult patient with missing tooth/helpless tooth requiring restoration**  |
| **I:** |
| **Immediate implant placement** |
| **C:** |
| **Two-stage implant therapy**  |
| **O:** |
| **Long term survival of first molar sites with single tooth restoration**  |
| **PICO Formatted Question:** |
| Among healthy adult patients requiring single implant restoration in first molar sites, when can immediate implant placement be recommended over two-stage implant therapy?  |
| **Clinical Bottom Line:** |
| Immediate implant placement has clinically comparable outcomes to two stage implant therapy and can be safely used within the scope of experienced clinicians.  |
| **Date(s) of Search:**  |
| **9/15/2020, 9/16/2020** |
| **Database(s) Used:** |
| **Pubmed** |
| **Search Strategy/Keywords:** |
| **Dental implant, immediate placement, two stage**  |
| **MESH terms used:** |
| **Dental implant, immediate placement, two stage**  |
| **Article(s) Cited:** |
| * **Ketabi, Mohammad, et al. “A Systematic Review of Outcomes Following Immediate Molar Implant Placement Based on Recently Published Studies.” *Clinical Implant Dentistry and Related Research*, vol. 18, no. 6, 2016, pp. 1084–1094., doi:10.1111/cid.12390.**
* **Ragucci, G.M., Elnayef, B., Criado-Cámara, E. *et al.* ”Immediate implant placement in molar extraction sockets: a systematic review and meta-analysis.”  *Int J Implant Dent* 6, 40 (2020).** [**https://doi.org/10.1186/s40729-020-00235-5**](https://doi.org/10.1186/s40729-020-00235-5)
* **Amin, Viraj, et al. “A Clinical and Radiographical Comparison of Buccolingual Crestal Bone Changes after Immediate and Delayed Implant Placement.” *Medicine and Pharmacy Reports*, 2019, doi:10.15386/mpr-1213.**
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| **Study Design(s):** |
| * **Article 1: Systematic Review**
* **Article 2: Systematic review and meta-analysis**
* **Article 3: RCT**
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| **Reason for Article Selection:** |
| * **Article 1: (Ketabi et al)**
	+ **Directly applied to PICO**
	+ **Looked specifically at mandibular molar implants**
* **Article 2: (Ragucci et al)**
	+ **Directly applied to PICO question – immediate implant placement in molar sites**
	+ **Recent data of high evidence emphasizing consistency in results from previous meta-analysis**
* **Article 3: (Amin et al)**
	+ **Directly compares immediate to delayed implant placement**
	+ **Can be used to weigh effects of choosing between immediate vs. delayed**
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| **Article(s) Synopsis:** |
| **Article 1 (Ketabi et al):** * **Method**
	+ **Systematic search of literature published from November 2008-May 2015 using databases: Embase, Ovid Medline, Pubmed, Scopus, ISI, Cochrane**
	+ **PICO format allowed definition of the study objectives**
	+ **15 studies included providing data on 768 immediate molar implants in 757 patients**
	+ **Meta-analysis performed to compare survival rate and mean bone loss**
* **Results**
	+ **Implant survival rate of 98%, no difference between maxilla and mandible**
	+ **5 studies included delayed molar implants as controls, no significant differences noted**
	+ **Higher implant failure for ultra-wide vs. wide diameter implants**
	+ **Overall cumulative bone loss after 1 year = .57 mm**

**Conclusions*** + **Data suggests high success rates with immediate implant placement of molars, and that there may be an optimal diameter for this procedure (wide 4-6 mm).**

**Limitations*** + **Quality of the 15 studies were regarded as “fair to average”**
	+ **No published reports from double-blind, randomized controlled clinical trials**

**Article 2: (Ragucci et al):*** **Method**
	+ **literature review of Pubmed, Cochrane and MEDLINE electronic databases**
	+ **Two independent reviewers screened and slected**
	+ **20 articles included, 990 patients and 1,106 implants analyzed**
	+ **Meta-analysis performed on selected articles using 95% confidence interval**
* **Results**
	+ **Overall:**
		- **97.8% survival rate**
		- **938.1% success rate**
	+ **Posterior Mandible:**
		- **97.4% survival rate**
		- **97.5% success rate**
		- **(less than maxilla but not significantly significant.**
	+ **Estimated MBL over 1 year 1.29 +/- .24 mm**
	+ **Higher implant success in grafted vs. non grafted**
	+ **Higher implant survival in < 5 mm diameter group vs >5 mm**

**Conclusions*** + **Immediate implant placement in molar extraction socket might be considered a predictable technique as demonstrated by high survival and high success rates with minimal bone loss**

**Limitations*** + **Included articles of lower evidence in the review – case series, cohort, retrospective studies**
	+ **Had to exclude an article with sample size of 12 implants from meta-analysis due to it effecting overall outcome**
	+ **Not all articles had a ‘comparison group’**

**Article 3: (Amin et al)** * **Method**
	+ **50 subjects needing extraction and replacement with dental prosthesis in anterior and premolar region**
	+ **Group A: immediate implants, Group B: implant placement delayed 6-8 weeks post extraction**
	+ **All implants submerged within alveoli confines, primary flap closure ensured**
	+ **Bone grafts only placed if jumping distance more than 1.5 mm**
	+ **No barrier membrane placed**
	+ **BL width measured at time of implant placement and during abutment placement (6 mo)**
* **Results**
	+ **31 implants placed in mandible, 19 placed in maxilla**
	+ **All implants successful , all achieved osseointegration with no mobility**
	+ **No statistically significant comparisons between group A and B**

**Conclusions*** + **Data in both groups suggest that the circumferential defect around implant will heal on itself without guided bone regeneration. Healing in both groups were equally good.**
	+ **Immediate implant placement saves cost, time, and need for extra surgery**

**Limitations*** + **This focused on premolar region rather than molar region**
	+ **Small sample size – 50 subjects**
	+ **Short follow up period – would prefer longer**
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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)[x]  **1b** – Individual RCT[x]  **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[ ]  **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[ ]  **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):** |
| * + **Literature suggests that immediate implant placement is comparable to delayed/two-stage implant placement in terms of osseointegration, healing, success and survival.**
	+ **Discussion with Dr. Brunner about his clinical experience further provided evidence that immediate implant placement is a comparable treatment option**
	+ **Patient wants to limit number of appointments and is eager to get the implant placed. Not overly concerned with cost.**
	+ **For this patient would recommend offering immediate implant placement as a safe, time efficient, and comparable alternative to delayed, two-stage.**
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