

A close-up photograph of a dental model, likely a maxillary (upper) arch, showing a patient's teeth and gums. The teeth are white and appear to be in various stages of decay or wear. The gums are a healthy pink color. The background is black.

Multidisciplinary Oral Rehabilitation for Patient Who Has Not Received Dental Care in Many Years

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I have included my speaker notes to demonstrate some of things I would have verbally presented at Excellence Day.

Background

- 66 year old female
- Referred to become my patient by her sister-in-law, who is also my patient
- CC: “My front tooth broke but it doesn’t hurt. I want to restore my oral health and replace my front tooth now.”
- Low financial budget, retired

Fun fact: This patient also referred her daughter-in-law to see me; I first-handedly experienced the power of referrals and “word of mouth.” I was able to get a lot of new patients through family/friend referrals especially because many of these patients had been looking for a dentist who speaks Cantonese.

Medical History

- **Type 2 Diabetes:**
 - 100mg sitagliptin (DDP-4 inhibitor), q1d
 - Well controlled, HbA1c = 6.0; blood sugar usually around 100-115 mg/dL
- **Hypertension:**
 - 50mg losartan (angiotensin II receptor antagonist), q1d
 - Risk of hyperkalemia due to impaired excretion of potassium → avoid taking supplements with potassium without supervision
 - 12.5mg hydrochlorothiazide (loop diuretic) , q1d
 - Frequent bathroom breaks
- **Baby aspirin:**
 - 81 mg, q1d
 - To prevent cardiovascular complications since patient's risk factors include T2D, HTN, and her age
 - Can increase BOP, do not need to discontinue before routine extractions including multiple extractions¹
- **Inactive hep B carrier (+HBsAg, - HBV DNA):**
 - 300 mg tenofovir, q1d as prophylaxis²
- **Vitamins: 500 mg calcium carbonate, q1d**
- **NKDA**

1. Brennan, Michael T., Richard L. Wynn, and Craig S. Miller. "Aspirin and Bleeding in Dentistry: an Update and Recommendations." ScienceDirect, July 6, 2007.

https://www.sciencedirect.com/science/article/pii/S1079210407002296?casa_token=-C76Awd99EAAAAA-9Ta_X6OEodliABJtwNQIWUer-9V2OSl6lJA_4AzZpaRIIRk7Nbp9QOHFFKrb9rWJ-RDFm-tpyUQ.

2. Invernizzi, Federica, Mauro Viganò, Glenda Grossi, and Pietro Lampertico. "The Prognosis and Management of Inactive HBV Carriers." Wiley Online Library, January 4, 2016.

<https://onlinelibrary.wiley.com/doi/full/10.1111/liv.13006>.

Normal fasting glucose for diabetic = 80-130 mg/dL.

Uncontrolled diabetes can lead to increase risk of perio, impaired wound healing, xerostomia; however, my patient's blood glucose is very well controlled. She checks her blood sugar every morning and always eats a hearty breakfast prior to her appointments. She also works with her physician to keep track of her HbA1c which was 6.0 from the most recent bloodwork.

It is interesting to note that some studies have shown that baby aspirin can lead to increase bleeding on probing even if periodontal conditions are stable; this is something that I will re-visit later on.

Notes:

Sitagliptin: dipeptidyl peptidase IV inhibitor → prevents the breakdown of incretins such as GIP and GLP-1, which increases the secretion of insulin and simultaneously decreases the release of glucagon by alpha cells of the pancreas

Losartan: angiotensin II causes vasoconstriction and aldosterone release, which would normally increase blood pressure so by inhibiting angiotensin II, all the downstream effects of renin, angiotensin I and II.

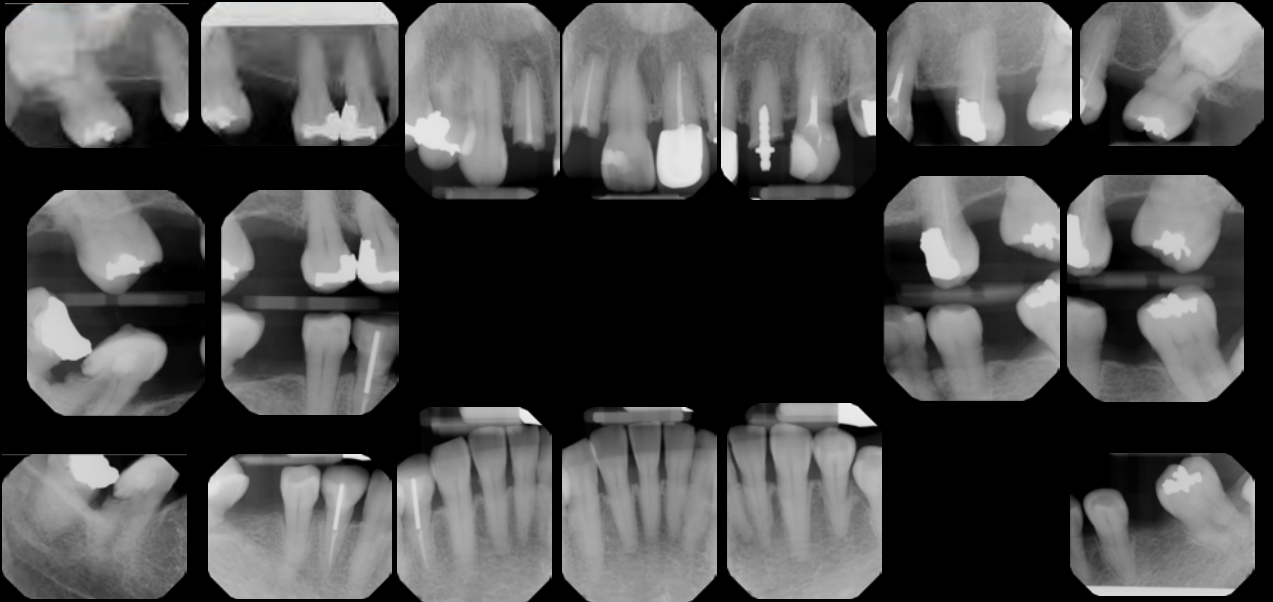
Dental History

- Received majority of dental work in China
- Had not visited dentist in over 2 years due to financial restrictions
- Went to UOP's ER because filling popped out on lower right and was rough on her tongue → student restored #32 MO with GI; tooth needed re-evaluation at ODTP
- #7 had broke beginning of 2019



In this photo, we can appreciate the GI filling on #32 MO. In the treatment notes, only #32 MO was treated; however, it looks like #31 DO is also filled with GI.

Radiographs: FMX



Some things to note:

Impacted #1, 16, 17 (I understand that the PA of #17 is not diagnostic. I wanted to take another PA at her recall but never got the chance to.)

Multiple amalgam restorations

Several root canal treated teeth

Missing first molars and #12

Intraoral Photos



These photos taken after 4 quads of SRP.

Once again, we can see multiple amalgam fillings, GI fillings, edentulous spaces on upper and lower (missing all first molars), fractured #7, discolored #11, low smile line (can see more of her mandibular teeth than her maxillary teeth).

Periodontal Charting

	3 3 3		3 3 3	3 2 3	3 2 3	2 2 3	3 3 3	3 3 3	3 3 3	3 2 3	3 4 3	6 4 5	PD			
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	4 5 4		4 5 4	3 2 3	3 2 3	2 2 3	2 3 2	2 3 2	2 5 3	4 6 5	4 8 4	7 4 5	Attach			
	2											2	Furcation			
													MG Inv			
													Calc			
	0		0	0	0	0	0	0	0	0	0	0	Mobil			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
	3 3 3		3 3 3	3 3 3	3 3 3	3 3 3	3 3 3	3 3 3	5 3 5	4 3 3		4 3 4	5 4 6	PD		
									B B	B		B B	N B B	Bleed		
	0 0 0		0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 1	1 0 0	0 0 0		0 0 -1	-1 0 -1	FreeGM		
	3 3 3		3 3 3	3 3 3	3 3 3	3 3 3	3 3 3	3 3 2	4 3 5	4 3 3		4 3 5	6 4 7	Attach		
	1 2												2 2	Furcation		
														MG Inv		
														Calc		
														Diag		

								4	4	3	4	4	5		Diag	
															Calc	
													2		MG Inv	
	1	2													Furcation	
	5 3 3	3 3 6		3 4 3	3 3 3	3 3 3	2 3 2	2 3 2	4 3 2	3 3 2	2 3 3	2 4 3	3 4 3	3 7 6	Attach	
	0 0 0	0 0 0		0 -1 0	0 0 0	0 0 0	1 0 1	1 0 1	0 0 1	0 0 1	1 0 1	1 -1 0	0 -1 0	0 -2 -1	FreeGM	
		B B									B	B	B B		Bleed	
	5 3 3	3 3 6		3 3 3	3 3 3	3 3 3	3 3 3	3 3 3	4 3 3	3 3 3	3 3 4	3 3 3	3 3 3	3 5 5	PD	
32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	
	0	0		0	0	0	0	1	1	0	0	0	0	1		Mobil
																Calc
																MG Inv
	1	2												1		Furcation
	5 3 3	4 5 4		3 4 3	4 4 4	2 3 3	2 3 3	2 3 2	3 3 2	3 3 2	2 3 2	4 4 4	3 4 4	4 5 5	Attach	
	-1 0 0	-1 -2 -1		0 -1 0	0 -1 0	1 0 1	1 0 1	1 0 1	1 0 1	1 0 1	1 0 1	0 -1 -1	0 -1 -1	-1 -2 -1	FreeGM	
				B B B	B	B	B				B	B	B	B B	Bleed	
4	3 3	3 3 3		3 3 3	4 3 4	3 3 4	3 3 4	3 3 3	4 3 3	4 3 3	3 3 3	4 3 3	3 3 3	3 3 4	PD	

Her periodontal findings are summarized on the next slide.

Periodontal Findings

- Probing depths: 2-7mm (deepest pockets in molars)
- Generalized recession and CAL of 2-8mm
- Generalized bleeding on probing
- Class I and II furcations on maxillary and mandibular molars
- No mobility
- Plaque index: 1.5 (poor)

Oral habits:

- Brushes 2x/day with toothpaste in the morning and with salt water at night

Periodontal diagnosis:

- Generalized moderate chronic periodontitis
- Stage III, Grade B

I tried to reinforce oral hygiene at every appointment since she had some misconceptions about oral habits. For example, she thought that brushing her teeth with salt water is better than toothpaste. I corrected her brushing technique since she did not brush along the gumline. I also taught her how to floss properly and showed her what interdental brushes look like/how to use them.

Dental Findings: Problem List

- #1: impacted
- #2: distal caries; need to re-evaluate after SRP
- #3: missing
- #4: MO amalgam overhang
- #7: fractured to gum line, previously RCT, periapical radiolucency
- #10: RCT with inadequate fill, metal post with radiolucent crown with open margin
- #11: mesial recurrent decay, previously RCT with inadequate fill
- #12: missing
- #13: mesial recurrent decay to gum line, previously RCT with inadequate fill
- #14: missing
- #16: impacted
- #17: impacted
- #19: missing
- #23: MF caries
- #30: missing
- #31: DO GI with DB/DL cusp fractured
- #32: temporary MO GI

Caries Risk Assessment

High caries risk:

- Disease indicator: #2-D, #11-M, #13-M, #23-MF, active caries,
- Risk factors: visible plaque on teeth, exposed roots
- Saliva pH: 5.5-6.9

- Protective factors: drinks fluoridated water, brushes with fluoridated toothpaste 1x/day, adequate saliva flow

Ideal Treatment Plan

Urgent Care:

- None; pt does not present with any pain or swelling

Disease Control:

- OHI, 4 quads SRP, ITE
- EXT #7, 10, 13, 31, 32
- #11 retreat RCT
- #2-D GI
- #23-MF composite

Reconstructive:

- Maxillary stayplate to replace #3, 7, 10, 12, 13, 14
- #11 post + core, PFM survey crown
- #4 MO composite
- Maxillary partial replacing #3, 7, 10, 12, 13, 14
- #19, 30, 31 implants + crowns

Maintenance:

- 3 month recall
- High fluoride toothpaste

This was the ideal treatment plan that also follows the 4 phases of treatment.

OHI: introduced high fluoride toothpaste to replace the salt water brushing at night

Reasons for extractions:

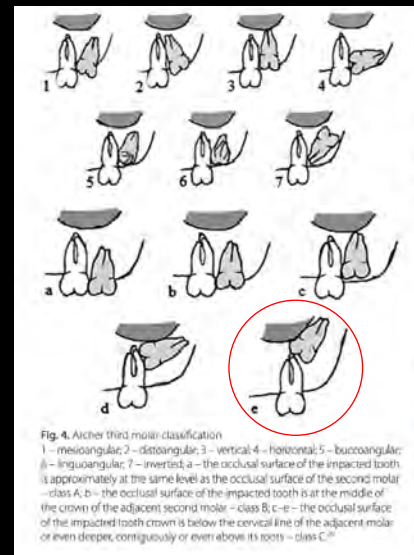
#7, 31, 32: nonrestorable

#10: poor prognosis to remove metal post and retreat RCT, place new post and new crown

#13: poor long term prognosis; would need to retreat RCT, place post, do crown lengthening and crown

Impacted Maxillary Third Molars

- If fabricating a maxillary partial, no need to extract #1 and 16
- If fabricating complete denture, need to surgically remove #1 and 16
 - Need to warn patient about maxillary sinus perforation¹
 - Perforation risk factors:
 - Increase age
 - Proximity to sinus floor (within 2mm)
 - Angulation and height of impacted tooth compared to second molar
 - Need CBCT



1. Lewusz-Butkiewicz, Katarzyna, Kinga Kaczor, and Alicja Nowicka. "Risk Factors in Oroantral Communication While Extracting the Upper Third Molar: Systematic Review," 2018. <http://www.dmp.umed.wroc.pl/pdf/2018/55/1/69.pdf>.

We talk about the risks of extracting impacted mandibular third molars a lot but I wanted to learn more about the risks of maxillary impacted third molars. Since my patient is already 66 years old and she has not experienced any complications with her maxillary impacted 3rd molars, we decided to leave them as they are. However, if my patient were experiencing complications such as pain or swelling, #1 and 16 would have to be surgically extracted. From the PA, it appears as if #1 and #16 are right at the apex of #2 and #15 respectively, either on the buccal or palatal side. The greatest risks would be maxillary sinus perforation and damage to #2 and #15. According to the article above, the circled position “e” is one of the highest risk positions for sinus perforation. A CBCT would be highly recommended if #1 and #16 needed to be extracted.

Alternative Treatment Plan

- **Maxillary immediate complete denture:**
 - Patient's remaining maxillary teeth have 1:1 crown to root ratio → questionable prognosis
 - #2 and 15 have class 1 and 2 furcations → poor prognosis
 - If patient does not want to try to save #11 with root canal retreatment, post + core, survey crown, then the maxillary partial will not be stable → therefore, better to do complete denture
 - Would also need to extract #1 and 16 surgically
- **Mandibular partial denture to replace #19, 30, 31:**
 - **Pros:** more cost effective, patient can remove denture to clean
 - **Cons:** patient needs to adapt to denture
 - #18 has a poor prognosis → if she loses #18, need to fabricate a new distal-extension partial



My patient's biggest concern that factored into her treatment decisions was finances. When I told my patient about the ideal and this alternative treatment plan, she mainly cared about how much it would cost. I explained to her that she would have to pay for the maxillary partial and implants if we followed the ideal treatment plan. However, Denti-Cal covers complete dentures and partials that oppose complete dentures, so this alternative treatment plan would be fully covered by insurance. The alternative treatment plan had originally appealed to my patient since everything would technically be "free;" however, I emphasized how it would take her some time to adapt to a full maxillary denture and a new mandibular partial denture. I told her that a lot of her maxillary teeth are still in decent condition and can be saved if she improves her oral hygiene. I told her that having natural teeth to chew and talk with will most likely give her more comfort than a complete upper denture. I urged her to consider the more conservative approach of the ideal treatment plan before we moved on with any decisions. At the next appointment, she told me that she would be willing to pay for maxillary and mandibular partial dentures because she did not want to lose all her upper teeth either. This was a really rewarding experience because I was able to use my expertise to guide my patient toward making a final decision. I was also able to shift her values from just prioritizing finances to thinking more about personal oral health, comfort, and happiness.

Accepted Treatment Plan/Treatment Rendered

- OHI
- LL and LR SRP
- impression of maxillary to fabricate immediate stayplate to replace #3, 7, 10, 12, 13, 14
- UL and UR SRP
- Retreat #11 endo
- EXT #7, 10, 13 + delivery of immediate stayplate



The next few slides illustrate the order in which treatment was actually rendered. This order would be more similar to what one may do in private practice in order to increase efficiency and patient comfort. Since I fully started this case in my third year, I felt faster and more confident in what I was doing; as a result, I was able to plan ahead better and get multiple procedures done in one appointment.

After finalizing the treatment plan with my patient, we completed LL and LR SRP and took alginate impressions of her maxillary and mandibular arches for diagnostic models and fabrication of an immediate maxillary stayplate.

I knocked off the teeth that were going to be extracted on her maxillary cast and designed an immediate stayplate to replace #3, 7, 10, 12, 13, 14.

While the lab was making the stayplate, I finished the UL and UR SRP and started retreating the endo. Retreatment of #11's root canal took 2 appointments and the final PA is shown on the slide.

By now, the stayplate had come back from the lab so we extracted #7, 10, 13 and delivered the immediate stayplate.

- ITE #1: due to BOP, PD, CAL, and presence of plaque, decided to re-scale/root plane certain teeth and reinforce OHI before determining subsequent tx
- Recommended end-tuft brush in areas adjacent to edentulous spaces such as the distal of #20
- ITE #2: BOP about the same, improved PD, and oral hygiene → pt can enter SPT at 3 month recalls
- BOP can be due to aspirin usage
- Plaque index: 0.8

The image displays six periodontal charts arranged in a 2x3 grid. Each chart represents a different visit or measurement for a patient's teeth. The charts are organized into two main sections: teeth 1-16 (top row) and teeth 17-32 (bottom row). Each chart has columns for various clinical parameters: PD (Periodontal Depth), Bleed (Bleeding on Probing), FreeGM (Free Gingival Margin), Attach (Attachment Loss), Furcation (Furcation Involvement), MG Inv (Mucosal Gingival Inflammation), Calc (Calculus), and Mob (Mobility). The data points are color-coded, with red indicating areas of concern or bleeding. The charts show a progression of clinical data over time, with the second visit generally showing improved values compared to the first visit.

There were some 5-6 mm probing depths at the first ITE so I reinforced oral hygiene and taught the patient how to use an end tuft brush to clean the areas adjacent to the edentulous spaces. Since my patient was missing all her first molars, she had the most trouble removing plaque at the mesial of the second molars and the distal of the second premolars. The end tuft brush allowed her to access these areas. I re-scaled her teeth and scheduled her for another ITE before we started with any definitive restorations such as the partial denture or crowns.

In the meantime, we completed her restorative work: #2-D GI and #23-MF composite. GI was used on the straight distal of #2 because it was difficult to isolate the area. We used an isovac since the rubber dam clamp was in my way when I clamped it on #2. Even then, it was difficult to access and isolate.

At the patient's second ITE, her probing depths improved and her plaque index was a lot better: 0.8. Bleeding on probing was the same as the previous appointment; while this would normally signify that the patient's periodontal status is unstable, I took into account that studies have shown that daily usage of baby aspirin can affect BOP. As a result, I concluded that my patient can enter SPT at 3 month recalls and we would continue to monitor her periodontal status and oral hygiene.

Accepted Treatment Plan/Treatment Rendered (cont'd)

- #2-D GI (poor isolation)
- #23-MF composite
- #11 post + core, Zirconia survey crown
- #4 MO composite
- Maxillary partial replacing #3, 7, 10, 12, 13, 14

Maintenance:

- 3 month recall
- High fluoride toothpaste



Patient's immediate stayplate that replaces #3, 7, 10, 12, 13, 14

After we finished the fillings on #2 and 23, I placed a post in #11 and prepared the tooth for a Zirconia survey crown. The #4 MO composite was done after preparation of #11 because this patient was also my Mock Boards patient.

The photo illustrates my patient's maxillary stayplate, which was very valuable throughout the process. In the beginning, my patient had trouble adapting to something removable in her mouth. She said the stayplate felt bulky and thick and she had to get used to speaking again. She also didn't know what to do with her tongue and would play with her stayplate. However, she did like the color and contours of the teeth. By the time we started making her final partial, she had gotten used to the stayplate, but I wanted to make her something that she would feel even more comfortable in.

When designing her final partial, I took into account her prior complaint of the stayplate feeling bulky and thick. I decided that I wanted to stick with the horseshoe design to prevent more material from covering her palate. With the horseshoe design, the chrome cobalt framework serves as the foundation for the partial denture, so no resin is needed over the framework on the palate. As a result the framework is even thinner than her stayplate, which my patient really liked at the try-in appointment. She had a good idea of how her final partial denture would look and feel since the anterior teeth were already set up in this first try-in appointment. Unfortunately, the school closed before I could do the final try-in with all the teeth set-up.

Progress Photos



Patient wearing her maxillary stayplate; photo displays her low smile line; #11 survey crown's color matches better with her natural dentition



Patient would like her final maxillary partial denture's teeth shade and mold to look exactly like her stayplate; she is aware that #9 looks lighter because it is a crown

Zirconia vs. PFM Survey Crown

- Traditionally, PFM is used as abutment survey crowns due to high strength; occlusal rests and guide planes can be placed in the metal; high esthetics
- Now, there have been improvements in strength and esthetics of all ceramic materials like Zirconia¹
- Long-term survival of Zirconia and PFM anterior survey crowns are comparable; more long term studies need to be performed for posterior teeth²

1. "All-Ceramic Surveyed Crowns for Removable Partial Denture Abutments." *The Journal of Prosthetic Dentistry* 84, no. 4 (October 2000): 400–402. https://www.sciencedirect.com/science/article/pii/S0022391300806563?casa_token=cBDBu0Qstc3AAAAA:cA8tB_N0ZFGDRmNDpneWef0-fCskVuiT02BiuJekkkEz0NeFbfjHUIiXYdNx31En_aNvlgFv0zA.
2. Wang RR, Lu CL, Wang G, Zhang DS. Influence of cyclic loading on the fracture toughness and load bearing capacities of all-ceramic crowns. *Int J Oral Sci.* 2014; 6(2):99–104.

We decided to use Zirconia instead of PFM after informing the patient of all the risk, benefits and alternatives. My patient decided that she wanted Zirconia instead of PFM because her insurance covered anterior Zirconia crowns. Studies show that the long term survival of Zirconia and PFM anterior survey crowns are comparable so I'm not too worried about her final decision.

Accepted Treatment Plan/Treatment Rendered (cont'd)

Future:

- Upon clinical examination, #31 and 32 restorations appeared sealed and patient was asymptomatic^{1,2}
- Due to financial restrictions, we decided to hold off on the extractions of #31 and 32 and fabrication of a mandibular partial but I explained that we would need to extract #31 and 32 if they become symptomatic; patient understood
- Having #31 and 32 in place also allowed for an easier fabrication of the maxillary partial since there were distal stops to evaluate vertical dimension

1. Mostafa Mousavinasab, Sayed, and Ian Meyers. "Fluoride Release by Glass Ionomer Cements, Compomer and Giomer." *Dental Research Journal* 6, no. 2 (2009): 75-81. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3075459/>

2. Rodrigues, Daniela S, Mihaela Buciumeanu, Antonio E Martinelli, Rubens M Nascimento, Bruno Henriques, Filipe S Silva, and Julio C Souza. "Mechanical Strength and Wear of Dental Glass-Ionomer and Resin Composites Affected by Porosity and Chemical Composition." Springer Link, August 13, 2015. <https://link.springer.com/article/10.1007/s40735-015-0025-9>.

GI's pros and cons:

Pro: GI has fluoride release, good under conditions with poor isolation, high compressive strength

Cons: poor wear resistance in high stress areas

References

1. "All-Ceramic Surveyed Crowns for Removable Partial Denture Abutments." *The Journal of Prosthetic Dentistry* 84, no. 4 (October 2000): 400–402.
https://www.sciencedirect.com/science/article/pii/S0022391300806563?casa_token=cBDBu0QsTc8AAAAA:cA8tBN0ZFGDRmNDppeWgf0-fCzkVuiT02BiulgkkFZoNeFbfjHUjIjXYdNx31Ep_aNvIqFvQzA.
2. Brennan, Michael T., Richard L. Wynn, and Craig S. Miller. "Aspirin and Bleeding in Dentistry: an Update and Recommendations." ScienceDirect, July 6, 2007.
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6. Rodrigues, Daniela S, Mihaela Buciumeanu, Antonio E Martinelli, Rubens M Nascimento, Bruno Henriques, Filipe S Silva, and Julio C Souza. "Mechanical Strength and Wear of Dental Glass-Ionomer and Resin Composites Affected by Porosity and Chemical Composition." Springer Link, August 13, 2015.
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7. Wang RR, Lu CL, Wang G, Zhang DS. Influence of cyclic loading on the fracture toughness and load bearing capacities of all-ceramic crowns. *Int J Oral Sci.* 2014; 6(2):99–104.