EVIDENCE BASED DENTISTRY ROUNDS
PRESENTS:

DENTAL MATERIALS

"Everybody's favorite subject"

September 23, 2020

TEAM 1B-4

D4

MAGDALENA HORNIK

D3

TANNER MENARD

D2

DORIS YANG

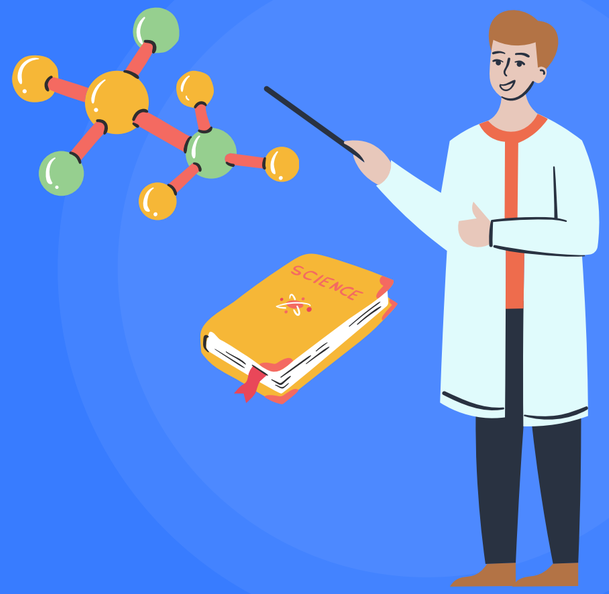
D1

EMMA CULLEN

THE GROUP LEADER

DR. SMITHY

THE SPECIALIST



DR. BERZINS

THE PATIENT

AGE

76 years old

GENDER

Female

ETHNICITY

Caucasian

CHIEF COMPLAINT

"I would like my front teeth fixed."

MEDICAL HISTORY

Diabetes

A disease in which your blood glucose levels are too high. Patient also experiences retinopathy.

Hypertension

High blood pressure- well managed.

Addison's Disease

A disorder in which the adrenal glands don't produce enough hormones, specifically cortisol but sometimes aldosterone as well.

MEDICAL HISTORY CONTINUED

Premedication

Right knee replacement in 2011. Per surgeon, patient is required to take premedication amoxicillin 500mg 4 tabs 1 hour prior to dental treatment for the rest of her life.

Medications

Baby aspirin
Omega 3-6-9
Centrum Silver Multivitamin
Vitamin B12
Ketotifen Fumerate
Hydrocortisone
Levothyroxine
Clonidine
Amlopidine
Losartan-Hydrochlorothiazide
Humalog insulin (as needed)
Iron
Viramin D3 1,000 mg

Endodontics

Root canal on #19

Prosthodontics

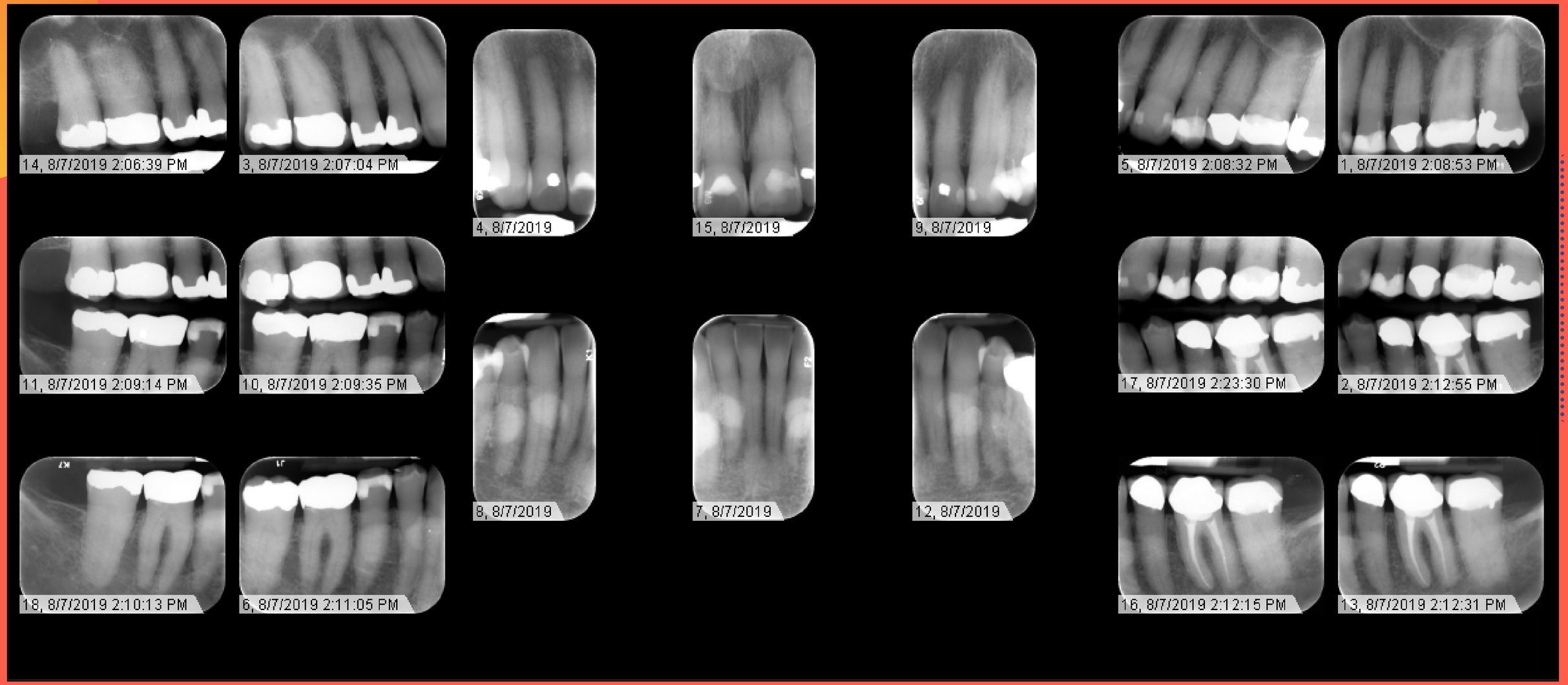
Numerous posterior crowns

Oral Hygiene

Brushes with electric toothbrush and flosses twice a day, maintaining excellent oral hygiene.

DENTAL HISTORY

RADIOGRAPHS



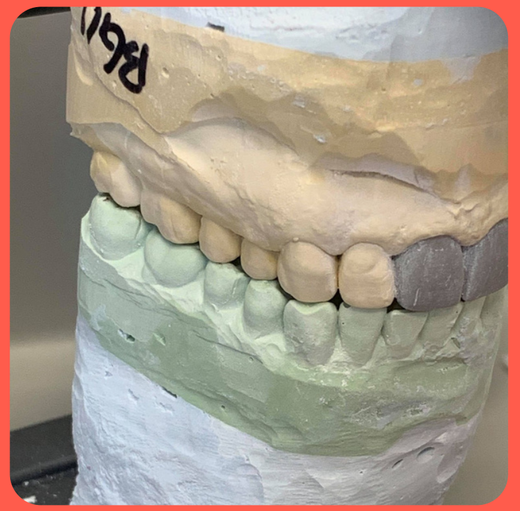
CLINICAL PHOTOS

CLINICAL PHOTOS

ADDITIONAL PHOTOGRAPHS

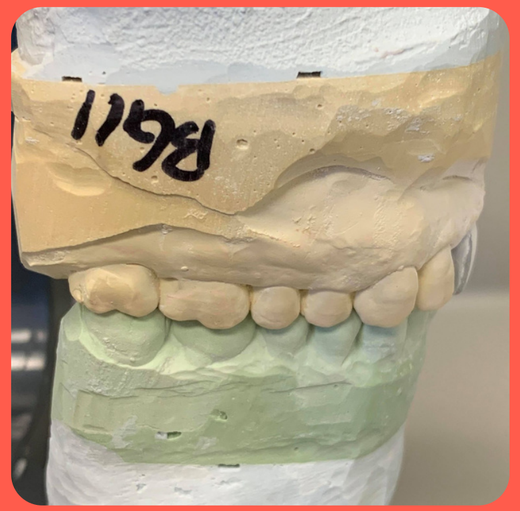
Closed, anterior

Occlusal, Maxilla



Excursion, Right Lateral

Anterior

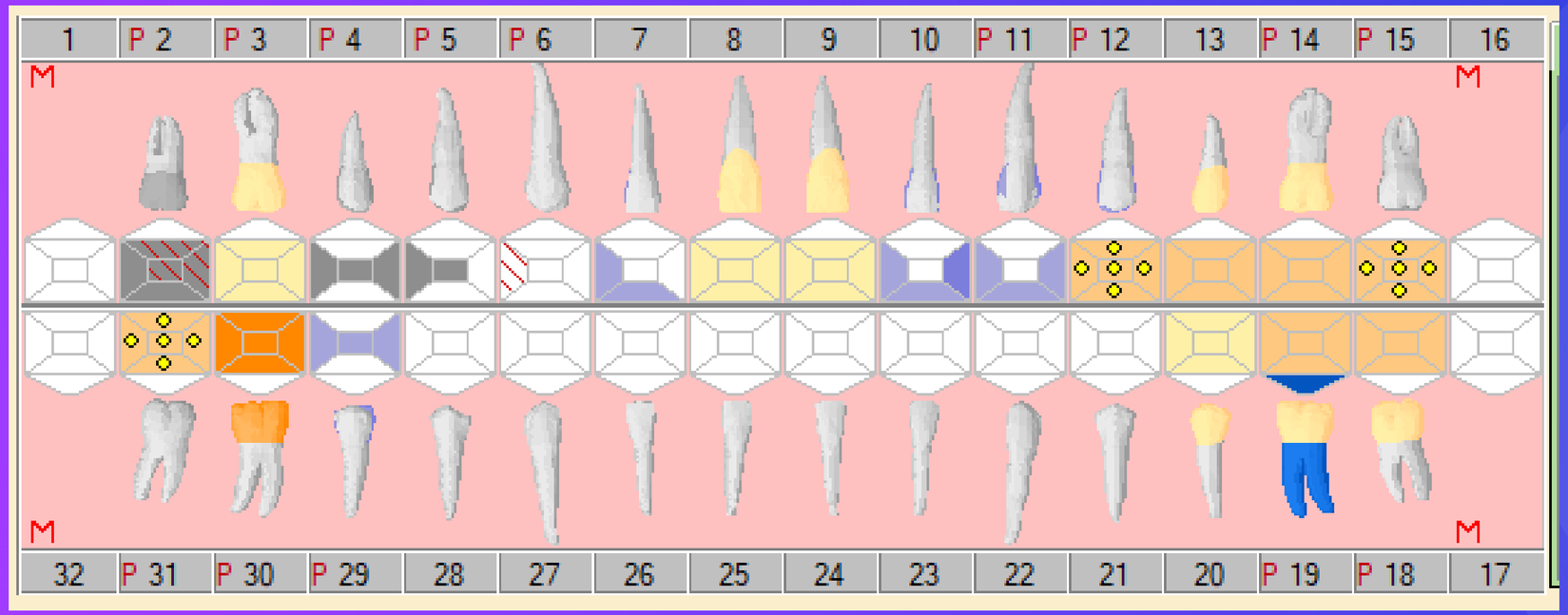


Lateral

Occlusal, Mandible

Excursion, Left Lateral

Lateral



SPECIFIC FINDINGS: ODONTOGRAM

SPECIFIC FINDINGS: PERIO CHART

																	MOBILITY
																	FURCA
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																	FURCA
																	MOBILITY

D1 BASIC SCIENCE: WHAT ARE CROWNS AND WHEN ARE THEY INDICATED?

CROWNS

1. Common restoration that cements a cap on top of a prepared damaged or decayed tooth

2. Help improve the strength and aesthetic while extending the durability and longevity of the tooth

3. Composed of indirect materials – all-ceramic (Porcelain) or metal-ceramic

4. Indicated when an older restoration needs replacement, broken cusp, fracture/crack, post-endodontic treatment, etc.

REFRENCES

1. Christensen GJ. Ceramic vs. porcelain-fused-to-metal crowns: give your patients a choice. J Am Dent Assoc. 1994 Mar;125(3):311-2, 314.

2. Direct and indirect restorative materials. (2003). The Journal of the American Dental Association, 134(4), 463 -472. doi:10.14219/jada.archive.2003.0196

3. Jacobs, D., Steele, J. & Wassell, R. Crowns and extra-coronal restorations:Considerations when planning treatment. Br Dent J 192, 257–267 (2002). https://doi.org/10.1038/sj.bdj.4801350

D2: WHAT ARE CRAZE LINES? WHAT CAUSES THEM?

Tiny cracks on adult teeth

Only affect enamel

Causes:

- Bruxism
- Abrasion
- Uneven occlusion

D2: ARE CRAZE LINES? WHAT CAUSES THEM?

Fig. I. Abrasions & Cracks in Teeth.. Dr. HC Leong Dental Surgeon LLP (2020). https://www.leongdental.com.sg/dental-abrasions-and-cracks.html

D3

CLINICAL QUESTION:

WHAT IS THE BEST MATERIAL FOR LONG TERM DURABILITY AND SURVIVAL OF ANTERIOR SINGLE UNIT CROWNS?

PICO FORMAT

P:Patients needing anterior crowns
I:Metal-ceramic (PFM)
C:All-ceramic
O:long term survivability of the restoration

PICO FORMATTED QUESTION

In patients requiring anterior crowns, do PFM anterior crowns have significant increased long-term survivability compared to all-ceramic anterior crowns?

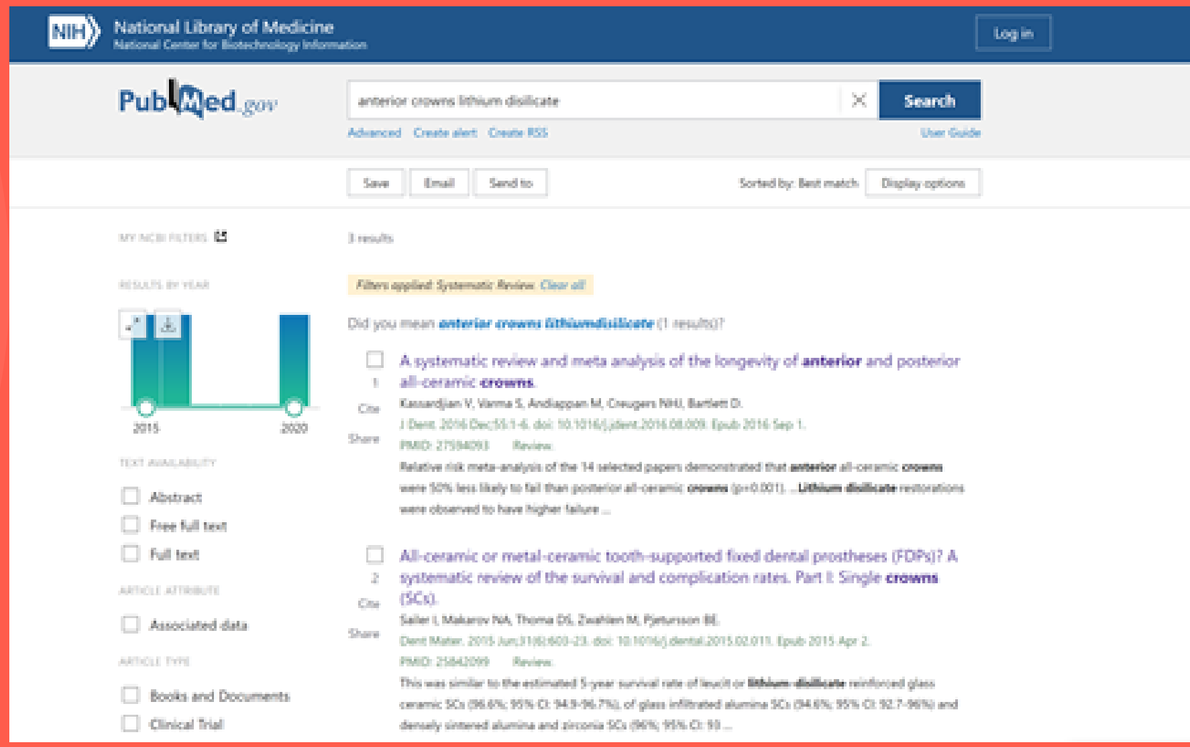
CLINICAL BOTTOM LINE

For an anterior single crown, the evidence shows that there is no statistically significant difference in 5-10 year survival rates between PFM and all-ceramic options. Therefore, choice of material will be decided on other factors including esthetics, biocompatibility and technical complications. All this considered, I would recommend lithium disilicate as the material of choice for an anterior single crown restoration.

SEARCH BACKGROUND

- Date(s) of Search: 9/20/2020
- Database(s) Used: PubMed
- Search Strategy/Keywords:

Crowns,
esthetics, dental prosthesis,
ceramics, metal ceramic alloys,
anterior



SEARCH BACKGROUND

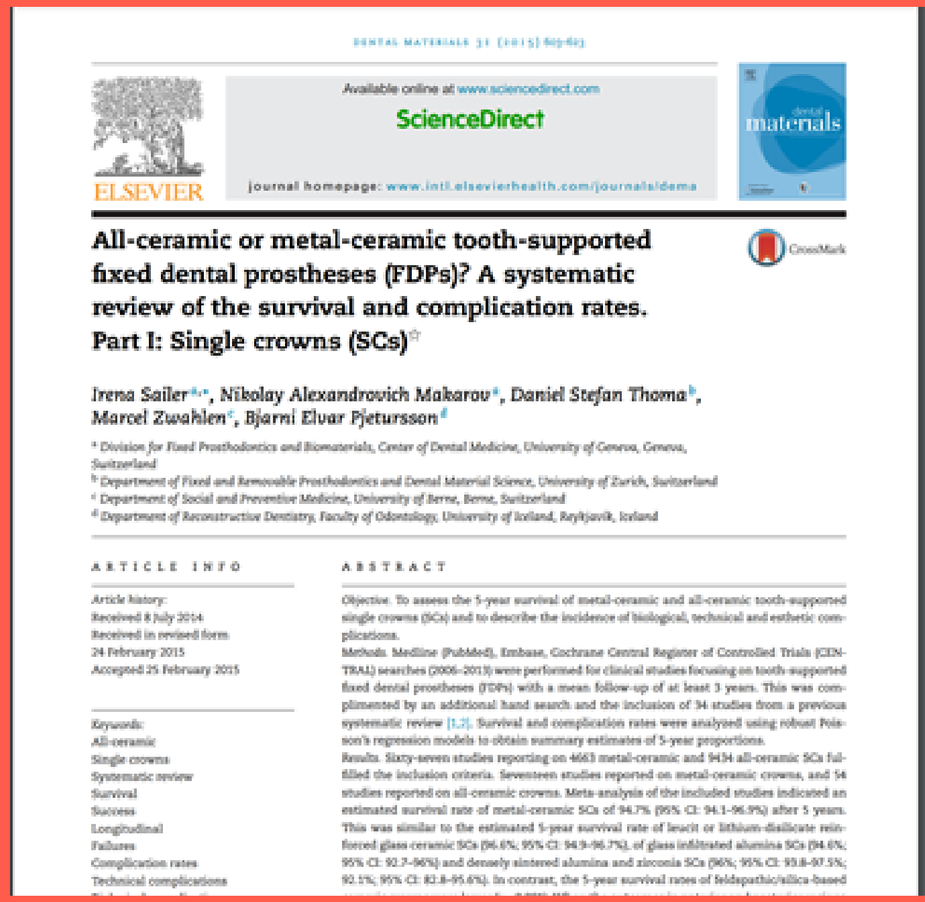
- MESH terms used:
- Crown
- Anterior
- Material
- Longevity

ARTICLE 1: ALL-CERAMIC OR METAL-CERAMIC TOOTH-SUPPORTED FIXED DENTAL PROSTHESES (FDPS)? A SYSTEMATIC REVIEW OF THE SURVIVAL AND COMPLICATION RATES. PART I: SINGLE CROWNS (SCS)

•Sailer I, Makarov NA, Thoma DS, Zwahlen M, Pjetursson BE. All-ceramic or metal-ceramic
tooth-supported fixed dental prostheses (FDPs)? A systematic review of the survival and complication rates. Part I: Single crowns (SCs) [published correction appears in Dent Mater. 2016 Dec;32(12):e389-e390]. Dent Mater. 2015;31(6):603-623.
doi:10.1016/j.dental.2015.02.011

•Systematic Review

•Study Need / Purpose: To compare long
term clinical outcomes between metal ceramic and all ceramic restorations in terms of longevity.



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dental materials

All-ceramic or metal-ceramic tooth-supported fixed dental prostheses (FDPs)? A systematic review of the survival and complication rates. Part I: Single crowns (SCs)☆

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Systematic review
Survival
Success
Longitudinal
Failures
Complication rates
Technical complications

ABSTRACT

Objective. To assess the 5-year survival of metal-ceramic and all-ceramic tooth-supported single crowns (SCs) and to describe the incidence of biological, technical and esthetic complications.

Methods. Medline (PubMed), Embase, Cochrane Central Register of Controlled Trials (CENTRAL) searches (2006–2013) were performed for clinical studies focusing on tooth-supported fixed dental prostheses (FDPs) with a mean follow-up of at least 3 years. This was complimented by an additional hand search and the inclusion of 34 studies from a previous systematic review [1,2]. Survival and complication rates were analyzed using robust Poisson's regression models to obtain summary estimates of 5-year proportions.

Results. Sixty-seven studies reporting on 4663 metal-ceramic and 9434 all-ceramic SCs fulfilled the inclusion criteria. Seventeen studies reported on metal-ceramic crowns, and 54 studies reported on all-ceramic crowns. Meta-analysis of the included studies indicated an estimated survival rate of metal-ceramic SCs of 94.7% (95% CI: 94.1–96.9%) after 5 years. This was similar to the estimated 5-year survival rate of leucit or lithium-disilicate reinforced glass-ceramic SCs (96.6%; 95% CI: 94.9–96.7%), of glass infiltrated alumina SCs (94.6%; 95% CI: 92.7–96%) and densely sintered alumina and zirconia SCs (96%; 95% CI: 93.8–97.5%; 92.1%; 95% CI: 82.8–95.6%). In contrast, the 5-year survival rates of feldspathic/silica-based

ALL-CERAMIC OR METAL-CERAMIC TOOTH-SUPPORTED FIXED DENTAL PROSTHESES (FDPS)? A SYSTEMATIC REVIEW OF THE SURVIVAL AND COMPLICATION RATES. PART I: SINGLE CROWNS (SCS)

•This systematic review examined over 67 studies which analyzed long term survival rates of single unit anterior crowns.

The major point of this study was to see if there was a difference in clinical durability between metal-ceramic (PFM) and all-ceramic restorations.

•Looked at 5-year time interval to measure survival

•Over 4,600+ PFM and 9,400+ ACC crowns included in the studies

•ACC esthetics > PFM esthetics

•

•Types of ACC

•Lithium Disilicate

•Glass infiltrated alumina

•Densely sintered alumina

•Zirconia

•Feldspathic based ceramic

ALL-CERAMIC OR METAL-CERAMIC TOOTH-SUPPORTED FIXED DENTAL PROSTHESES (FDPS)? A SYSTEMATIC REVIEW OF THE SURVIVAL AND COMPLICATION RATES. PART I: SINGLE CROWNS (SCS)

•Difference in survival rates between PFM and ACC crowns in the anterior were not statistically significant.

•Biolgocially, ACC outperformed metal-ceramics.

•Certain types of all-ceramic materials have unique indications and contraindications

•5 yr survival of PFM was 94.7%

•5 yr survival of ACC was between 87.5-96.6%

•Feldspathic ceramics had lowest 5 yr survival rate at 87.5%

•Lithium Disilicate had the highest 5 yr survival rate at 96.6%

SAILER, ET. AL SELECTION

High level of evidence and directly addressed the PICO question

ARTICLE 2: CLINICAL OUTCOMES OF LITHIUM DISILICATE SINGLE CROWNS AND PARTIAL FIXED DENTAL PROSTHESES: A SYSTEMATIC REVIEW

•Pieger S, Salman A, Bidra AS. Clinical outcomes of lithium disilicate single crowns and partial fixed dental prostheses: a systematic review. J Prosthet Dent. 2014 Jul;112(1):22-30. doi: 10.1016/j.prosdent.2014.01.005. Epub 2014 Mar 24. PMID: 24674802.

•Systematic Review

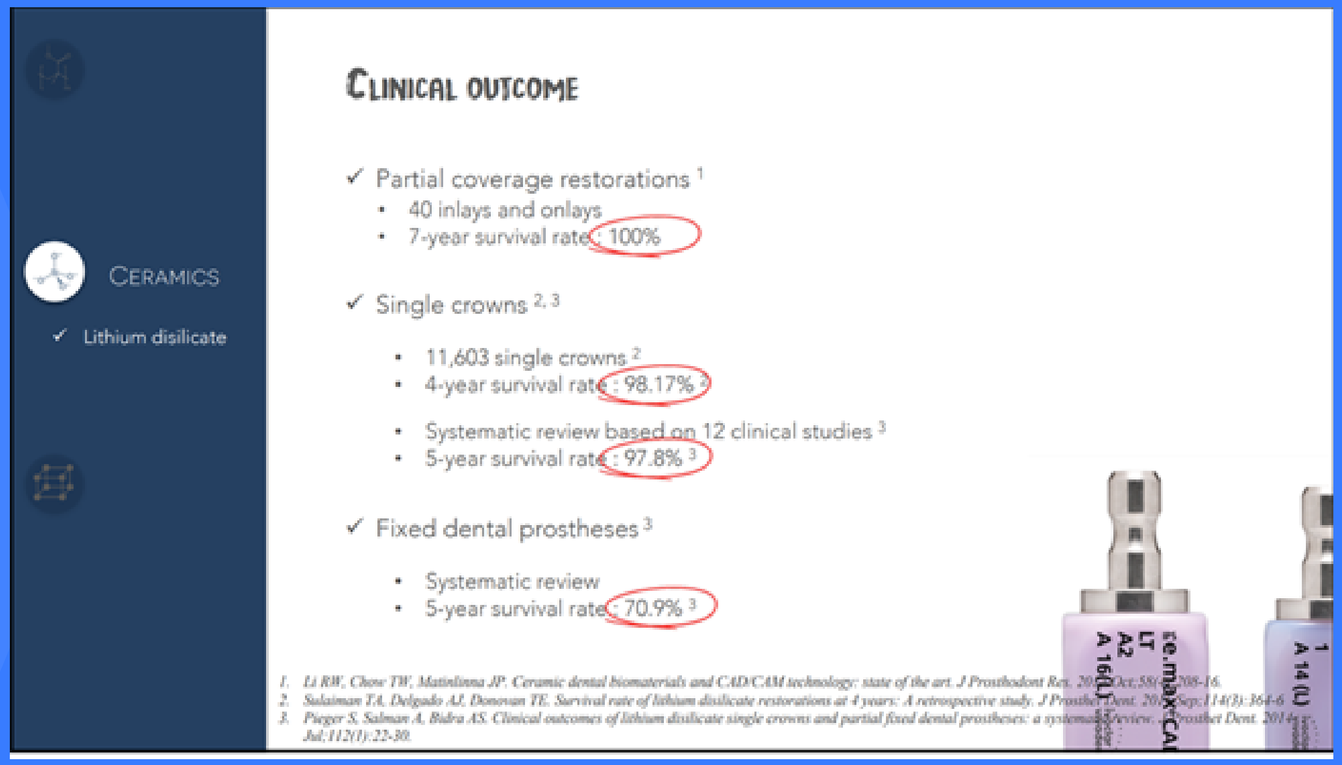
•Study Need / Purpose: To determine the long term clinical survival of lithium disilicate single crowns

CLINICAL OUTCOMES OF LITHIUM DISILICATE SINGLE CROWNS AND PARTIAL FIXED DENTAL PROSTHESES: A SYSTEMATIC REVIEW

- The purpose of this systematic review was to analyze the short-term (1- to 5-year) and medium-term (5- to 10-year) survival rates of lithium disilicate single crowns and partial fixed dental prostheses.
- 12 clinical studies were included in the review. All referenced tooth-retained lithium disilicate restorations.
- The 2-year cumulative survival rate for single crowns was 100%
- 5 year-97.8%
- 10 year-96.7%
- For lithium disilicate single crowns, the existing evidence indicates excellent short-term survival rates, but the evidence for medium-term survival is limited.

PIEGER, ET. AL SELECTION

•Article was selected due to high level of evidence and focus on a particularly popular clinical material of choice for anterior crowns.



ARTICLE 3: CLINICAL OUTCOMES OF LITHIUM DISILICATE GLASS-CERAMIC CROWNS FABRICATED WITH CAD/CAM TECHNOLOGY: A SYSTEMATIC REVIEW

•Aziz A, El-Mowafy O, Paredes S. Clinical outcomes of lithium disilicate glass-ceramic crowns fabricated with CAD/CAM technology: A systematic review. Dent Med Probl. 2020 Apr-Jun;57(2):197-206. doi: 10.17219/dmp/115522. PMID: 32673449.

•Systematic
Review

•Study Need/Purpose: Analysis of short-medium term survival of lithium disilicate crowns fabricated by CAD/CAM technology

CLINICAL OUTCOMES OF LITHIUM DISILICATE GLASS-CERAMIC CROWNS FABRICATED WITH CAD/CAM TECHNOLOGY: A SYSTEMATIC REVIEW

- The aim of this study was to evaluate the survival rate of anterior and posterior monolithic and bi-layered lithium disilicate glass-ceramic (LDGC) CAD/CAM crowns, and to identify the types of complications associated with the main clinical outcomes reported in clinical trials

- Six studies, 154 participants, 204 crowns

- This review indicated that the medium-term survival rate of LDGC CAD/CAM crowns was high.

- Further multicenter studies with longer follow-ups and larger sample sizes are needed in order to augment the data already in existence.

AZIZ, ET AL SELECTION

- This piece of research was selected due to its high level of evidence and its clinical relevance to changing practices in regard to the increased use of CAD/CAM technology to fabricate crowns.

LEVELS OF EVIDENCE

- ☐ **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
- ☐ **6** – Expert Opinion without explicit critical appraisal, Narrative Review
- ☐ **7** – Animal Research
- ☐ **8** – In Vitro Research

STRENGTH OF RECOMMENDATION TAXONOMY (SORT)

☐	**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

CONCLUSIONS: D3

The evidence seems to indicate that there is no clinical difference in short-medium term survivability of metal-ceramic (PFM) and all-ceramic (lithium disilicate) anterior crowns. Further long-term studies are needed to determine the 15-25 year outlook on the longevity of all ceramic style crowns. That being said, lithium disilicate offers improved biocompatibility and esthetics; both key factors in successful anterior crown treatment.

D4: CONSIDERING CLINICAL EXPERIENCE AND RELEVANT RESEARCH, WE MADE #8 AND #9 CROWNS USING LITHIUM DESILICATE

THANK YOU