National Dental PBRN Western Regional Meeting
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Cracked Teeth Registry

Tom Hilton and Jack Ferracane

Oregon Health & Science University
Portland, OR

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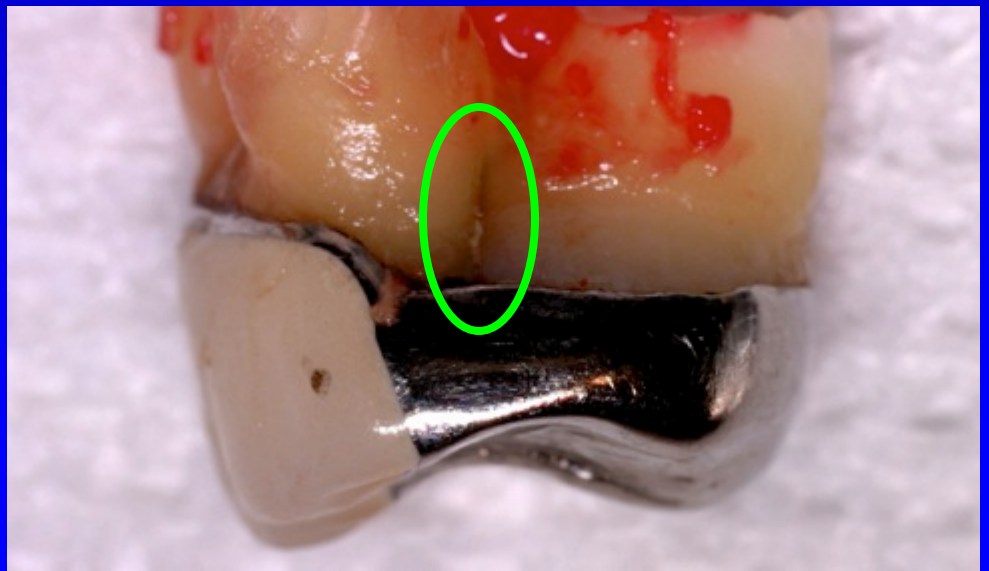
- 3 major questions:
  - What cracked teeth are likely to get worse?
  - When should we intervene?
  - What should that treatment be?



NWP Study Priority Survey – 17 Study Options

7. Cracks in Teeth/Cusp Fractures - Assessing the impact of occlusion and restorative type on crack formation/progression

Q: Are cracks in teeth more associated with specific types of dental restorative materials and occlusal habits?

R: Anecdotal reporting suggests that amalgams cause cracks in teeth, but some literature suggests the incidence is not greater than for composites or gold.

	1 (Highest Interest)	2 (Moderate Interest)	3 (Average Interest)	4 (Minimal Interest)	5 (No Interest)	Response Average

Nearly 2/3 of 111 member practitioners responding felt studying cracked teeth was of highest interest/priority for NWP

8. Cracks in Teeth/Cusp Fractures - Assessing the impact of occlusion and restorative type on crack formation/progression

Q: When intervention is needed due to tooth cracks, what intervention is best to avoid later endodontic treatment or extraction, i.e. cuspal coverage or bonded restoration?

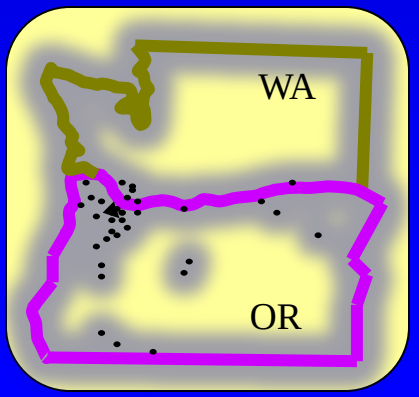
R: No one knows what the best procedure is for restoring teeth with large cracks.

	1 (Highest Interest)	2 (Moderate Interest)	3 (Average Interest)	4 (Minimal Interest)	5 (No Interest)	Response Average
a. Relevance/Importance to the general dentist?	68% (75)	26% (29)	6% (7)	0% (0)	0% (0)	1.39
b. Importance to you?	67% (74)	25% (28)	8% (9)	0% (0)	0% (0)	1.41
c. Interest in participating?	65% (72)	23% (25)	8% (9)	3% (3)	2% (2)	1.54
					Total Respondents	111

Cracked Teeth: A Preliminary Practice-based Prevalence Survey

- All PROH practitioners invited
- Random selection of adult patients
- Limited to 1st & 2nd molars
- Data collected:
  - Surfaces with cracks, restorations
  - Type of restoration
  - Connection of crack to restoration
  - Symptoms
  - Wear

PROH



PROH Cracked Tooth Survey

# of participating dentists	48
# of patients evaluated	1,962
# of molars evaluated	14,346
% of all molars with at least one crack	31.4%
% individuals with at least one cracked molar	66.1%
% individuals with more than one cracked molar	46.2%
% individuals with symptomatic cracked molar	10%

Hilton TJ, Ferracane JL, et al. J Dent Res 2007, 86: abst 2044

Results

Odds Ratio: Risk of Crack by Restoration Type (vs. No restoration)

Amalgam = 7.72

Composite = 4.05

Ceramic = 0.42

Gold = 0.34

Odds Ratio: Risk of Crack by Wear Category (vs. None to Slight Wear)

Moderate = 1.8

Severe = 2.2

NW PRECEDENT STUDY

Assessing the Outcomes of Cracked Teeth

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Assessing the Outcomes of Cracked Teeth

- Objective
  - Identify risk factors (at tooth, restoration, patient levels) for adverse tooth outcomes in cracked teeth (symp/asymp)
  - Identify interventions and treatment outcomes
- Random selection of adult patients inspected for presence of external teeth cracks and associated signs and symptoms
- Non-random symptomatic teeth
- Follow at 6-month intervals for 2 years
- Goal = 35 sites; 20 patients/site

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Baseline Results - Descriptive

- 630 patients from 34 sites with eligible cracked tooth
  - Prevalence of patients ≥ 1 cracks = 78%; symptomatic = 11%
  - Cracked tooth characteristics:
    - 55% mandibular
    - 72% molars
    - 14% maxillary premolars
    - 14% mandibular premolars
    - 31% maxillary molars
    - 41% mandibular molars

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Baseline Cracked Tooth Characteristics

Associated with reporting pain

Tooth Characteristic	Symptomatic OR (95% CI)
Maxillary premolar	(Reference)
Mandibular premolar	0.37 (0.15, 0.89)
Maxillary molar	2.39 (1.42, 4.03)
Mandibular molar	3.73 (2.14, 6.50)
Multiple cracks (vs. single crack)	2.28 (1.55, 3.37)
# surfaces > 1 with crack	1.54 (1.34, 1.77)

Follow-up Results - Descriptive

- 373/630 patients from 34 sites with > 1 year follow-up + 5 extracted cracked teeth = 378 subjects with follow-up data.
  - Mean follow-up = 1.5 years
  - Primary outcomes:
    - 2.1% extracted (or recommended for extraction)
    - 2.1% RCT (or recommended for RCT)
    - 31% restorative (or recommended for restorative)
    - 10% initially asymptomatic developed symptoms
    - 25% showed crack progression (e.g. more cracks, more surfaces)

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Lessons Learned

- KISS!
- Time!
- Numbers!
- Follow-up!

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Lessons Learned

Loss to follow-up (LTF)

Effect of treatment on crack progression

827 patients screened

↓

630 patients enrolled

↓

378 patients with at least 1 visit after baseline and before tx

↓

220 patients received tx

↓

175 patients had at least 1 visit after tx

↓

7 patients showed crack progression after tx

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New Cracked Tooth Registry

- Primary Objectives:
  - Identify external crack characteristics predictive of adverse outcomes
  - Identify external characteristics that correlate with crack penetration deeper into the tooth

Ultimate goal: cracked tooth risk assessment system

  - Evaluate treatment effectiveness
  - Determine cracked tooth treatment philosophy

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New Cracked Tooth Registry

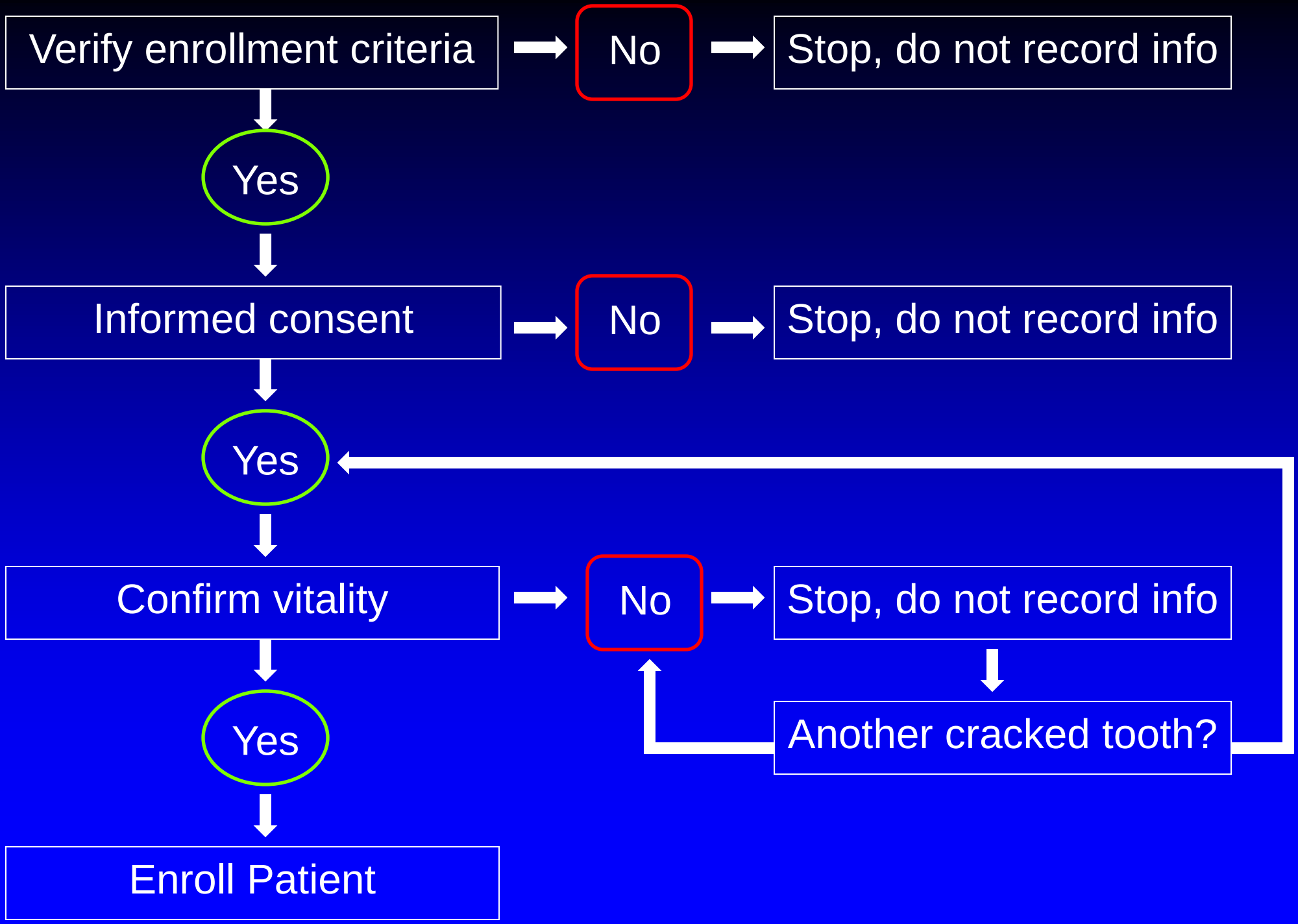
- Differences from NWP registry:
  - More: practices, subjects, time
  - National in scope
  - Internal crack characterization
  - More focused data collection
  - Increased emphasis on follow-up
    - Convenience sample: patient reliability
    - Rapid enrollment & recall (8 weeks)
    - Break between enrollment & recall
    - Appoint recalls

New Cracked Tooth Registry

- Goals:
  - 3,000 subjects
    - 150-300 practices
    - 10-20/practice
    - Even distribution by region
  - High subject retention
  - Adequate data for significant correlations

New Cracked Tooth Registry
Protocol

- Enrollment criteria:
  - Patient ≥19, ≤85
  - One vital, posterior cracked tooth
  - Patient willing to come in for annual recall
  - Patient willing to be contacted by multiple entities
- Record patient, tooth, crack level data
  - Patient behaviors survey (e.g. clench, grind, chew ice)
  - Record number and location of cracks & restorations
  - Response to cold, biting
  - Characteristics (e.g. crack direction, restoration material)


Verify enrollment criteria
No
Stop, do not record info
Yes
Informed consent
No
Stop, do not record info
Yes
Confirm vitality
No
Stop, do not record info
Another cracked tooth?
Yes
Enroll Patient

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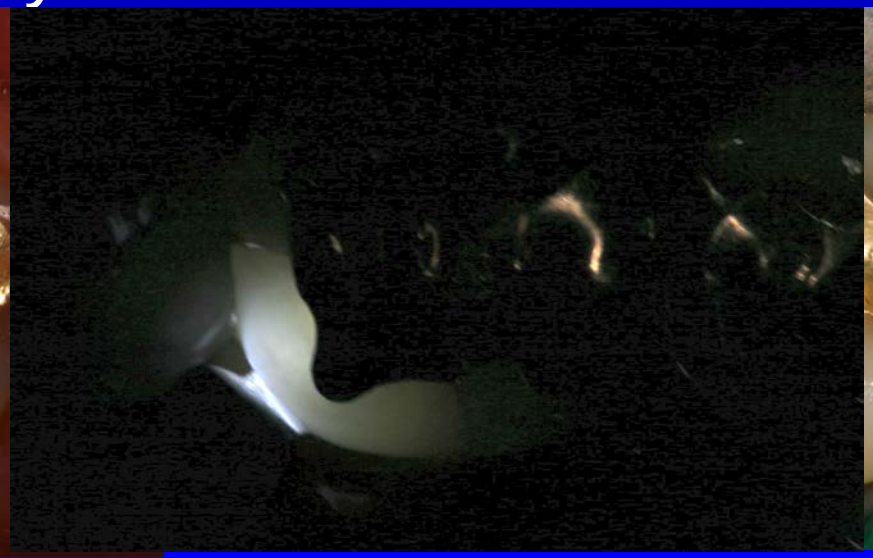
New Cracked Tooth Registry

Protocol

- Treatment:
  - Any time any treatment on study tooth
  - Opportunity to record internal cracks



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New Cracked Tooth Registry

Protocol

- Follow-up:
  - Annually; attempt to recall in 8 week window
  - Recalls allowed -1 to +5 mos after enrollment anniversary
  - Record essentially same data as baseline

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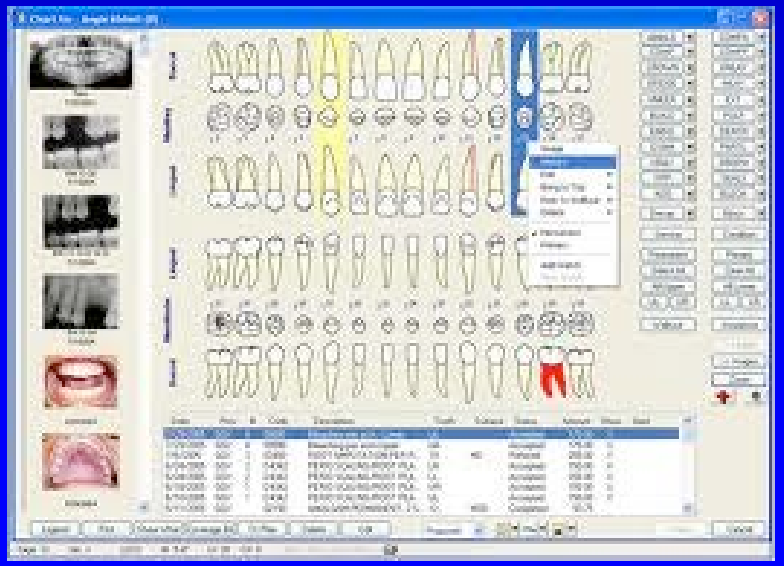
New Cracked Tooth Registry

Protocol

- Sub-study:
  - Use electronic data collection in subset of practices
  - Compare ease & accuracy with paper forms



New Cracked Tooth Registry

Protocol

- Thanks!
- We're looking forward to working with you