Symposium - The worn dentition - part 1

Host
Tandlægeforeningen

Date
03.11.2023

Reservations
All reservations of the correct reproduction of the course material in the notes are taken by the author.

Top 3 Dental Insights

1. Tooth wear was common in ancient times

Tooth wear was a common disease in ancient times. Very few people had tooth decay in ancient times, as they only ate sweet things like berries, fruits and honey from the forest. People mostly ate seeds, grains and meat.

The Grauballe Man's last meal contained seeds and grains from cereals and willowherb, for example, as well as a spoonful of quartz stone, which comes from the weeds found among the cereals. In every Iron Age meal, there are small pebbles from the threshed grain that was sorted on the floor.

2. 10 clinical signs of mechanical and chemical tooth wear, respectively

10 clinical signs indicating the influence of mechanical factors
1. Shiny facets
2. Enamel and dentin wear at the same rate (like a slice of cheese from a cheese grater)
3. Matching wear on occluding surfaces / corresponding features at the antagonistic teeth
4. Impression in cheek, tongue and/or lip
5. Usually located at cervical areas of teeth
6. Lesions are more wide than deep
7. Premolars and cuspids are commonly affected
8. Fracture of cusps and/or restorations
9. Crack in enamel
10. Torus mandibularis (can be a sign of mehcanical overloading of the masticatory muscles)

10 clinical signs indicating the influence of chemical factors
1. Occlusal 'cupping', incisal 'grooving', 'cratering'.
2. Wear on non-occluding surfaces.

3. 'Raised' restorations
4. Broad concavities within smooth surface enamel
5. Increased incisal translucency
6. Clean, non-tarnished appearance of old amalgam fillings
7. Preservation of enamel 'cuff' in gingival crevice (often sign of gastric reflux)
8. No plaque, discoloration or tartar
9. Hypersensitivity (especially in young patients)
10. Smooth silky-shining, silky-glazed appearance, dull surface

3. Risk evaluation of tooth wear and saliva production

Documentation and monitoring of tooth wear
• Indices
• Intraoral photos
• Dental casts/scans
• X-rays (bitewings, panoramic)

Tooth wear is not a linear process. There are active vs inactive periods.
Documentation every 1-2 years is great.

Clinical Oral Dryness Score
1. Mirror sticks to buccal mucosa
2. Mirror sticks to tongue
3. Tongue lobulated/fissured
4. Tongue shows loss of papillae
5. Frothy saliva
6. No saliva pooling in floor of mouth
7. Glassy appearance of other oral mucosa, especially palate
8. Debris on palate (excluding under dentures)
9. Altered/smooth gingival architecture
10. Active or recently restored (last 6 months) cervical caries (more than 2 teeth)

Xerostomia questionnaire
There are 11 questions, but it's sufficient to ask only these 5 most important questions:
1. My mouth feels dry when eating a meal.
2. My mouth feels dry.
3. I have difficulty in eating dry foods.
4. I have difficulties swallowing certain foods.
5. My lips feel dry.

Risk assessment of tooth wear with the "Wearogram" (DC-TWES)
Physical markers:
• Masseter muscle hypertrophy
• Loss of canine guidance
• Impressions in cheek, tongue, lip
• Shortened dental arch
• Wear facets

Medical markers:
• Sleep disorders
• Psychology
• Genetics (men have weaker enamel than women)
• Pain
• Saliva

Social markers:
• Alcohol abuse
• Smoking
• Drugs
• Caffeine
• Erosive diet
• Sports (athletes often have dry mouth and drink acidic sports drinks)

Erosive Wear Risk Assessment (EWAR) questionnaire
1. Consumption of soft drinks
2. Consumption of energy and/or sports drinks
3. Consumption of juices
4. Consumption of alcohol
5. Consumption of fruits
6. Erosive drinks (soft, sport, energy drinks, juices) kept in the mouth for longer period when consumed
7. Erosive drinks (soft, sport, energy drinks, juices) for quenching thirst between meals
8. Reflux
9. Vomiting
10. Do you feel pain or "icing" after eating or drinking something acidic or cold?

That was Top 3 Dental Insights.

Get the rest of the notes below and as a PDF at the bottom of this mail.

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What does the Grauballe Man's tooth wear tell us about the ancient times?

V/ Pauline Asingh, anthroprologist at Moesgaard Museum

Discovered by chance in a bog in 1952, the Grauballe Man looked like a recently deceased person. It is more than 2000 years old, from 290 BC. The anoxic environment and antiseptic plant spaunum stops the decomposition process. The Grauballe Man is exceptionally well preserved and has beautiful hair, skin and nails. He is so well preserved and has the consistency of a boot now. His stomach contents were also well preserved.

Exhibiting a dead man was a new phenomenon when Moesgaard first exhibited him. The Grauballemand had 21 teeth that were loose, and they were extracted to examine them, and then unfortunately forgotten at the Aarhus School of Dentistry for 20 years, so they have shrunk quite a bit. Dorthe Arenholt Bindslev examined the Grauballe Man's teeth. The gray baleen man's teeth are small and very worn, and there is no enamel left. All of his teeth have a distinct horizontal line that was formed at 3-5 years of age, most likely due to malnutrition or life-threatening disease or discontinuation of breastfeeding and transition to an Iron Age diet.

The Grauballe Man's last meal contained seeds and grains from cereals and willowherb, as well as a spoonful of quartz stones, which come from the weeds found among the cereals. In every Iron Age meal, there are small pebbles from the threshed grain that was sorted on the floor.

The Grauballe Man was about 34 years old and handsome, strong and healthy. He had no signs of illness or arthritis, only a blow to the shin and a slit throat. Perhaps the Grauballe Man was a sacrifice to bring back the light. Grauballemanden was laid in the icy bog in winter, which had several excavation holes.

Tooth wear was a common disease in ancient times. Very few people had tooth decay in ancient times, as they only ate sweets in the form of berries, fruits and honey from the forest. People mostly ate seeds, grains and meat.

Subtypes of tooth wear and determining etiology

V/ Peter Wetselaar, dentist, Amsterdam, chair of orofacial pain at ACTA

A new classification system for tooth wear
Tooth Wear Evaluation System (TWES 2.0)
Diagnostic Criteria for Tooth Wear (DC-TW) (2023)

Tooth wear = the general classification of loss of dental hard tissues from the mouth.
• Attrition: tooth-to-tooth contact
• Abrasion: thirdbody contact wear
• Erosion: chemical loss of surface contour due to mineral acids
• Caries: subsurface loss of hard tissue due to pathologiclal process

Tooth wear is a chemical-mechanical process of cumulative loss of hard tissue, not caused by bacteria. It's a multifactorial condition leading to the loss of hard dental tissues (enamel, dentin, root cementum).

Tooth wear causes
1. Mechanical:
   1. Intrisinc (attrition). Always functional, sometimes bruxism.

2. Extrinsic (abrasion). Always brushing, often other causes.

2. Chemical:
   1. Intrinsic (erosion). Stomach acid is always very acidic, vomiting, reflux (GERD), alcohol, pregnancy, obesity, eating disorder.
   2. Extrinsic (erosion). Diet is always acidic (can be healthy or unhealthy). Fruits are good, sugar is bad. Swimming, asthma inhalators and medicine can also cause erosion.

We have to establish whether the tooth wear is due to mechanical overload, diet, gastric reflux etc. It's multifactorial.

TWES-Screening = quantification per sextant.
TWES-Status

Source: *Diagnosting tooth wear, a new taxonomy based on the revised version of the Tooth Wear Evaluation System (TWES 2.0), Wetselaar P et al, 2020*.

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In Amsterdam, abfraction is abandonded. It was believed that abfraction is a sign of overloading, but tooth wear is multifactorial. Now they don't use 'abfraction' anymore.

Dry mouth / hyposalivation is a worsened defense mechanism, that make the teeth more susceptible to tooth wear.

Clinical assessment, classification and taxonomy of tooth wear
V/ Peter Wetselaar, dentist, Amsterdam, chair of orofacial pain at ACTA

Quantification of the tooth wear = grading the severity = give a number.

There are many older tooth wear indices.

Tooth Wear Evaluation System (TWES 2.0)

TWES-Screening of occlusal/incisal tooth wear
0 = No wear
1 = Wear within the enamel
2 = Wear with dentin exposure, loss of clinical crown height under 1/3
3 = Wear with dentin exposure, loss of clinical crown height more than 1/3 but under 2/3
4 = Wear with dentin exposure, loss of clinical crown height more than 2/3

TWES-Screening of non-occlusal/incisal tooth wear
0 = No wear
1 = Wear within the enamel
2 = Wear with dentin exposure (under 50% of the area)
3 = Wear with dentin exposure (more than 50% of the area)
4 = Wear with dentin exposure (complete loss of enamel or pulp exposure)

Spreading of tooth wear
Localized tooth wear involves a few teeth (1-2 sextants)
Generalized tooth wear involves most of few teeth (3-6 sextants)

Source: *The tooth wear evaluation system: a modular clinical guideline for the diagnosis and management planning of worn dentitions. Wetselaar P et al*.

TWES-Severity of tooth wear
0 = No
1 = Mild
2 = Moderate
3 = Severe
4 = Extreme

Pathological vs physiological tooth wear
When tooth wear is pathological, and not physiological, we have to start restorative treatment. But when is it pathological?

Physiological tooth wear:
Some degree of tooth wear is expected during a life time. Not all tooth wear needs treatment.
Pain-free function of the dentition throughout life. Function is chewing and aesthetics.
Physiological tooth wear is a part of normal aging.

Increased prevalence of tooth wear: people become older, and people keep their own dentition longer.

Tooth wear is "the third attack on the dentition", besides caries and periodontitis.

Mechanical AND chemical tooth wear combined will increase the rate of tooth wear and make it pathological.

European Consensus Statement (ECS)

Prevalence of severe tooth wear is increasing with age
3% of 20 year olds
20-45% of adults
17% of 70 years olds

Pathological tooth wear
Atypical tooth wear for the patient's age, pain or discomfort or sensitivity, functional problems, deterioration of aesthetic appearance, undesirable complications of increasing complexity.

5 signs of pathological tooth wear
1. Fast progress of the tooth wear process after a period of monitoring.
2. Wear is atypical for the age of the patient.
3. Etiological factors not influenceable.
4. Surfaces that are involved in occlusion and articulation, leading to the loss of VDO (vertical dimension of occlusion).
5. The condition of saliva.

Source: Wetselaar P et al. Diagnosing tooth wear, a new taxonomy based on the revised version of the Tooth Wear Evaluation System (TWES-2.0). 2020.

5 symptoms of the patient of pathological tooth wear
1. Sensitivity and/or pain
2. Functional problems (problems chewing and eating)
3. Deterioration of aesthetic appearance
4. Crumbling of dental hard tissue and restorations
5. Phonetic impairment

Source: Wetselaar P et al. Diagnosing tooth wear, a new taxonomy based on the revised version of the Tooth Wear Evaluation System (TWES-2.0). 2020.

Pathological tooth wear that need restorative treatment
Tooth wear with dentin exposure (moderate, severe, extreme) +
Detection of at least 1 of the 10 pathological signs and symptoms +
Origin (mechanical/chemical, instrinsic/extrinsic)

It's important that the patient only get restorative treatment, if the patient and the dentist both share the decision making. It will not be a succes, if the dentist decide for the patient. The patient has to want the restorative treatment.

Tooth wear is multifactorial, and is often has both mechanical AND chemical origin.

A taxonomy can help both trained and untrained dentists in diagnosing tooth wear.

Questionnaires regarding tooth wear attack
• Bruxism
• GERD reflux
• Eating disorders
• Food diaries

Questionnaires regarding tooth wear consequences
• Aesthetics
• Function
• Oral dryness

Documentation and follow-up of tooth wear - risk and progression assessment

V/ Peter Wetselaar, dentist, Amsterdam, chair of orofacial pain at ACTA

Documentation and monitoring of tooth wear
• Indices
• Intraoral photos
• Dental casts/scans
• X-rays (bitewings, panoramic) (however, x-rays are not precise enough for monitoring tooth wear)

Tooth wear monitoring TWES-documentation
Once every year? Once every 5 years?

It's better to monitor tooth wear once a year!
Use an index once every 1-1,5 year.
Intraoral photos once every 2 years.
Dental casts are only necessary when starting the restorative treatment, and every 3.5 years.
Intraoral scans once every 2 years, and once every 0,5-2 years.

Tooth wear is not a linear process. There are active vs inactive periods. Documentation every 1-2 years is great.

Source: Monitoring of erosive tooth wear: what to use and when to use it. 2023.

Source: *A methodology for evaluation system: a modular clinical guideline for the diagnosis and management planning of worn dentitions. Wetselaar P et al, 2020*.

Risk assessment of tooth wear
TMD
Burning mouth syndrome (BMS)
Saliva
Genetics
Etc.

DC-TWES risk assessment with the "Wearogram"
Physical markers:
• Masseter muscle hypertrophy
• Loss of canine guidance
• Impressions in cheek, tongue, lip
• Shortened dental arch
• Wear facets

Medical markers:
• Sleep disorders
• Psychology
• Genetics (men have weaker enamel than women)
• Pain
• Saliva

Social markers:
• Alcohol abuse
• Smoking

- Drugs
- Caffeine
- Erosive diet
- Sports (athletes often have dry mouth and drink acidic sports drinks)

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7. Erosive drinks (soft, sport, energy drinks, juices) for quenching thirst between meals
8. Reflux
9. Vomiting
10. Do you feel pain or "icing" after eating or drinking something acidic or cold?

Source: Margarita V et al. Multicenter study to develop and validate a risk assessment tool as part of composite (?) scoring system for erosive tooth wear. 2021.

Saliva analysis
Saliva is of paramount importance of oral health.
Hyposalivation = objective
Xerostomia = subjective

Prevalence 10-80%

Source: Uena-Puy C. The role of saliva in maintaining oral health and as an aid to diagnosis. 2006.

Oral dryness risk factors
- Medication
- Radiation head/neck
- Diabetes
- Auto-immune diseases (Sjögren)
- Malnutrition
- Stress, depression, fear

Source: Uena-Puy C. The role of saliva in maintaining oral health and as an aid to diagnosis. 2006.

Clinical Oral Dryness Score
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4. Tongue shows loss of papillae
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8. Debris on palate (excluding under dentures)
9. Altered/smooth gingival architecture
10. Active or recently restored (last 6 months) cervical caries (more than 2 teeth)

Scores:
0 = No

1 = Yes
Range 0-10, where 2-3 is normal, and more than 5 is hyposalivation.

Source: Clinical oral dryness source: evaluation of a new screening method for oral dryness. 2018.

Xerostomia questionnaire
There are 11 questions, but it's sufficient to ask only these 5 most important questions:
1. My mouth feels dry when eating a meal.
2. My mouth feels dry.
3. I have difficulty in eating dry foods.
4. I have difficulties swallowing certain foods.
5. My lips feel dry.

The 6 other questions:
6. I sip liquids to aid in swallowing food.
7. I get up at night to drink.
8. I suck sweets or cough lollies to relieve dry mouth.
9. The skin of my face feels dry.
10. My eyes feel dry.
11. The inside of my nose feels dry.

Give only 3 answer options for the patient:
1. Never
2. Occasionally
3. Always

Source: The xerostomia inventory: a multi-item approach to measuring dry mouth. 1999.

Saliva testing of 3 things
• Saliva amount
• Saliva buffer capacity
• Saliva acidity

That was Dental Insights. Thank you for being here. ❤️

Dental love, Anne Mette