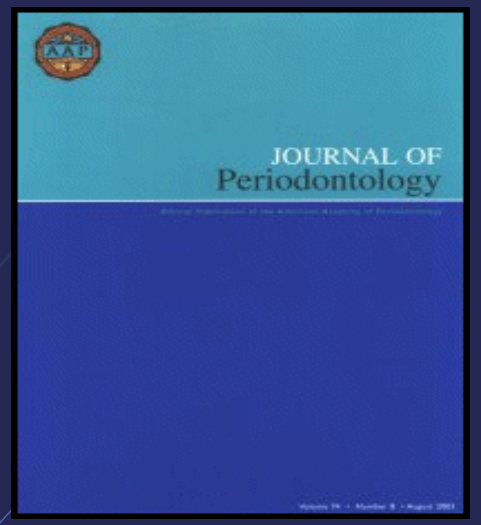
Periodontics – Solid Foundations for Saving Teeth

Andre Bendyk

Research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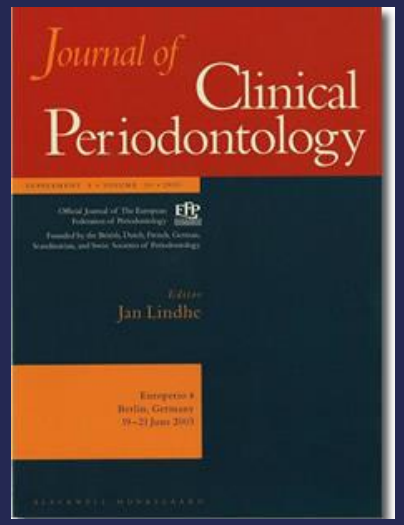
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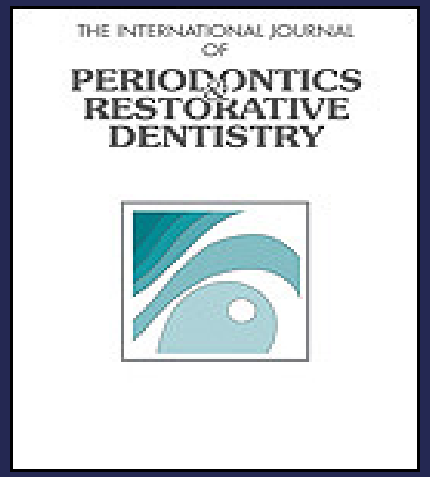
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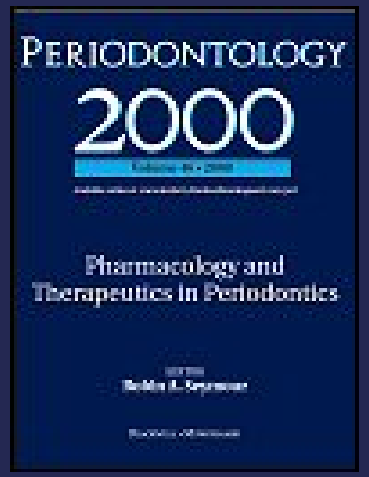
PERIODONTOLOGY
2000
Pharmacology and
Therapeutics in Periodontics


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Disease Initiation and Progression

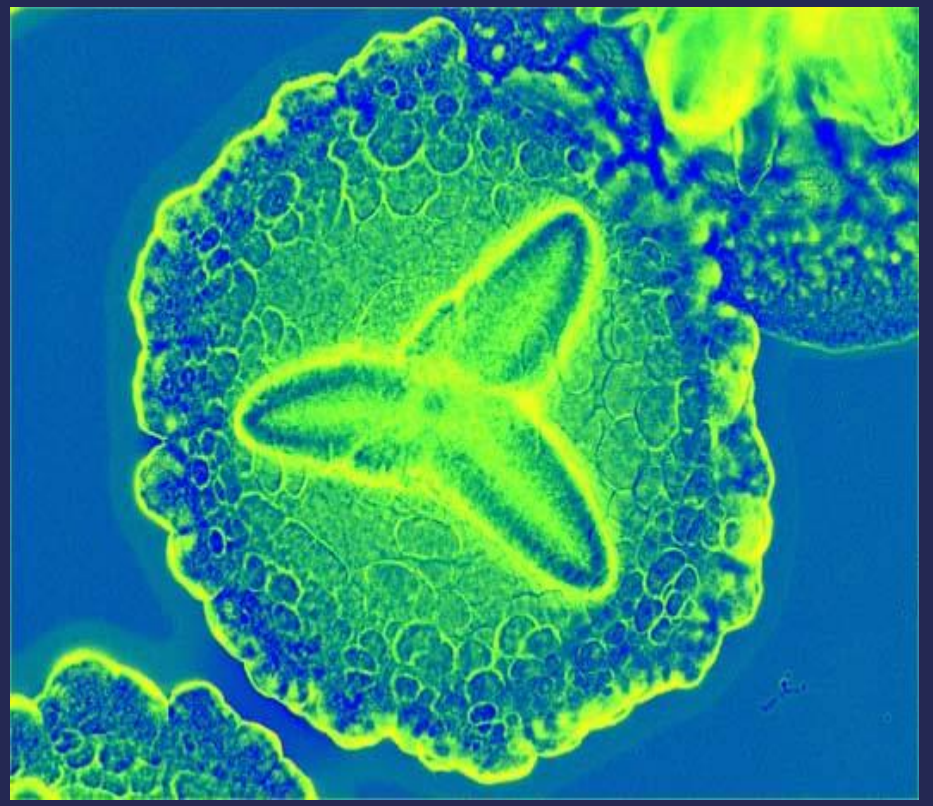
1)Bacteria

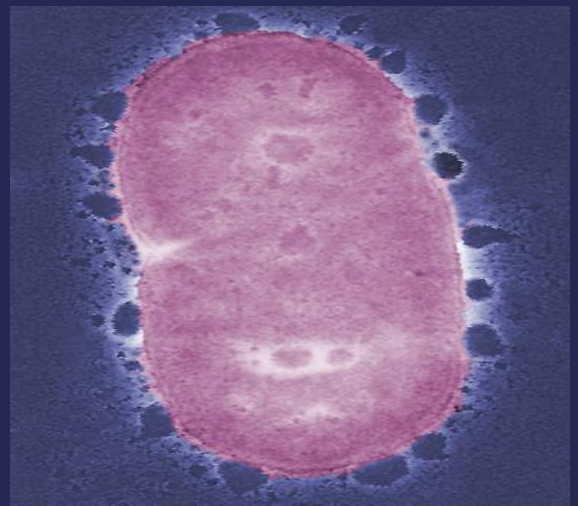
2)Host

3)Environmental Influences

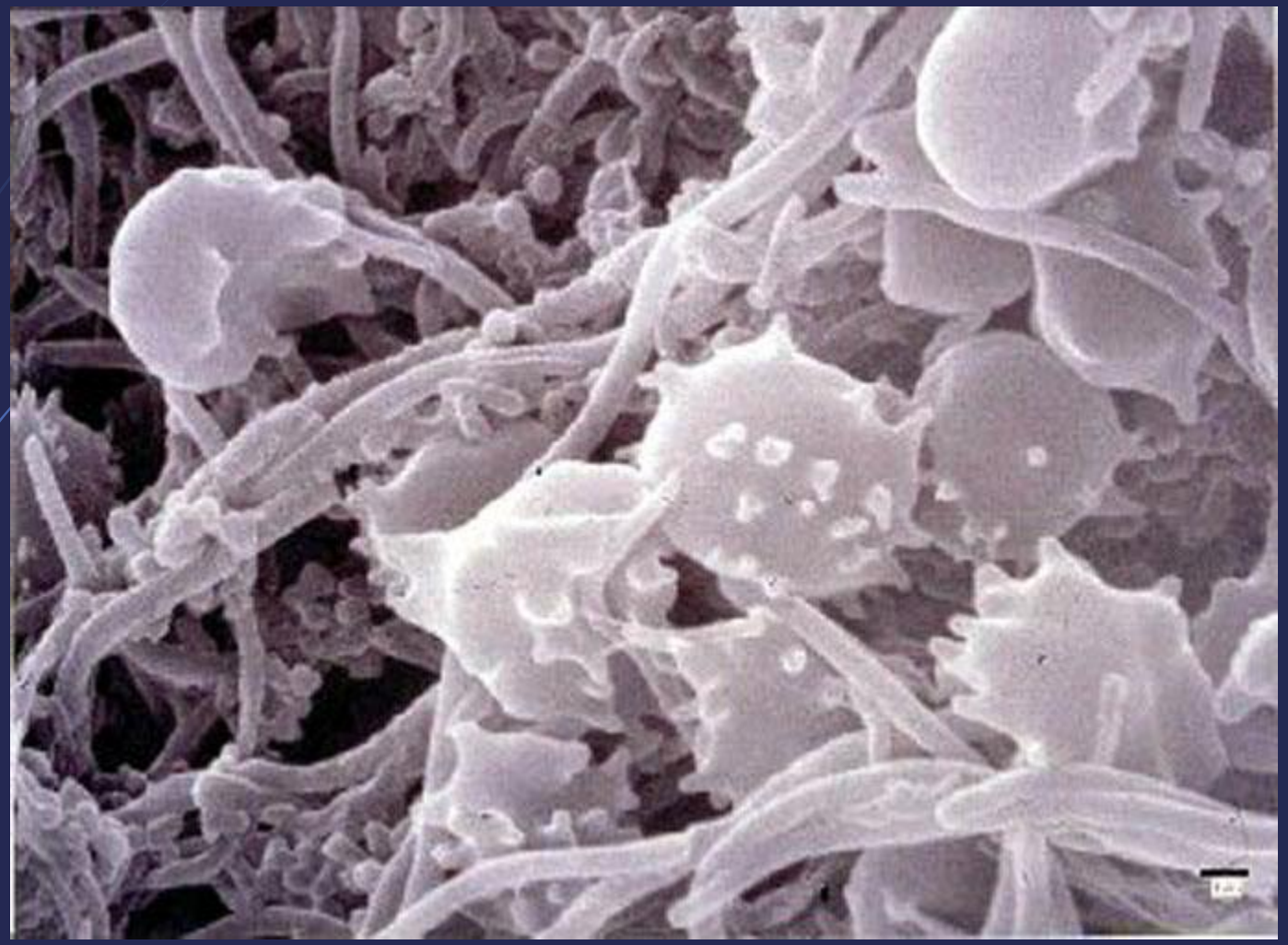
Periodontopathogens

- *P.gingivalis*
- *A. actinomycetemcomitans*
- *P. intermedia*
- *T. forsythensis*
- *T. denticola*





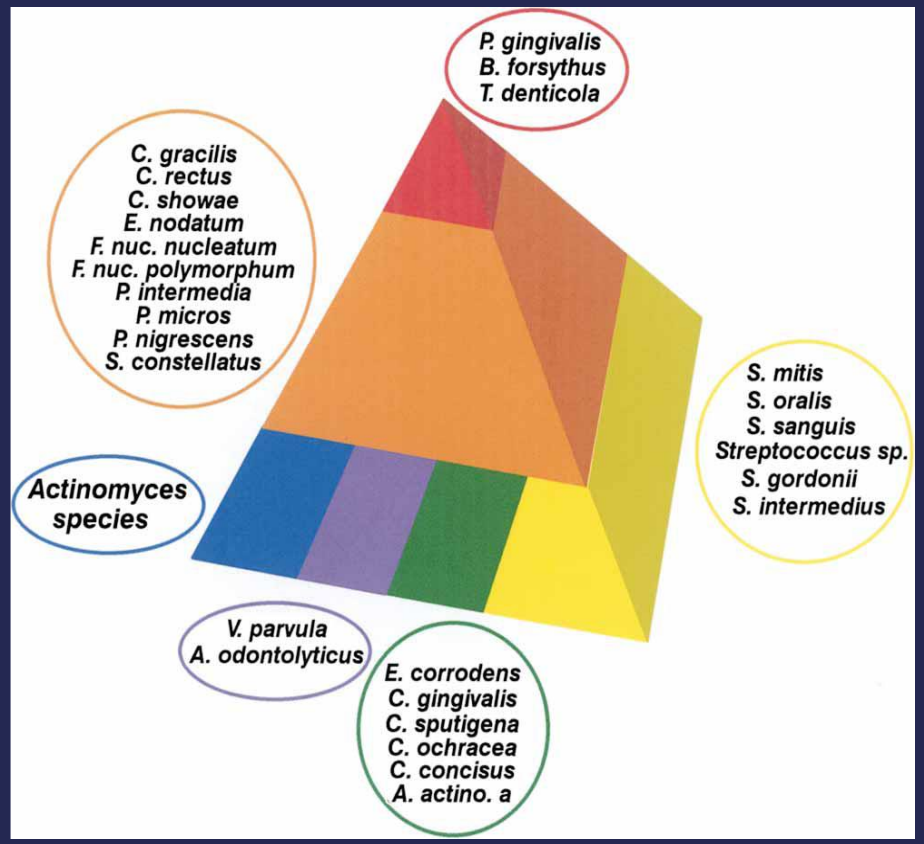
Plaque Biofilms



- Spatial and Functional organisation between species
- Mature with time

Microbial Complexes in Subgingival Plaque

Socransky SS, Haffajee AD, Cugini MA, Smith C, Kent RL
J Clin Periodontol. 1998 Feb;25(2):134-44.



Cugini et al, Journal of Periodontology 2000

Red Complex

- A range of studies have demonstrated that members of the red complex are:
- 1) More common in deep than shallow sites
- 2) Isolated more frequently from pockets thought to have undergone recent destruction compared to non progressing sites
- 3) Found very frequently in significant quantities in cases of periodontitis which prove refractory to treatment

Red Complex

- Holt and Ebersole (05) suggest that these red complex organisms have many host activating properties which act together to exert ‘pathogenic synergism’

Pathogenesis

1)Bacteria

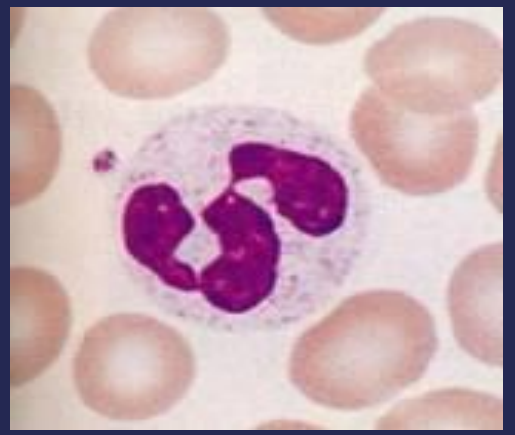
2)Host

3)Environmental Influences

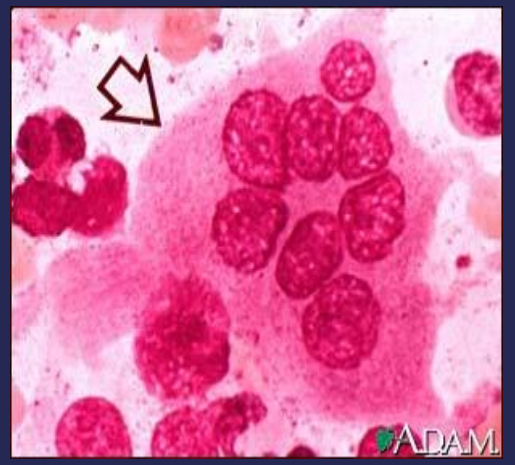
Host

- In human periodontitis, the vast majority of periodontal tissue destruction occurs as the result of a dysregulated immunoinflammatory response to periodontopathic bacteria and their virulence factors – rather than as a direct action of bacterial products themselves

Host

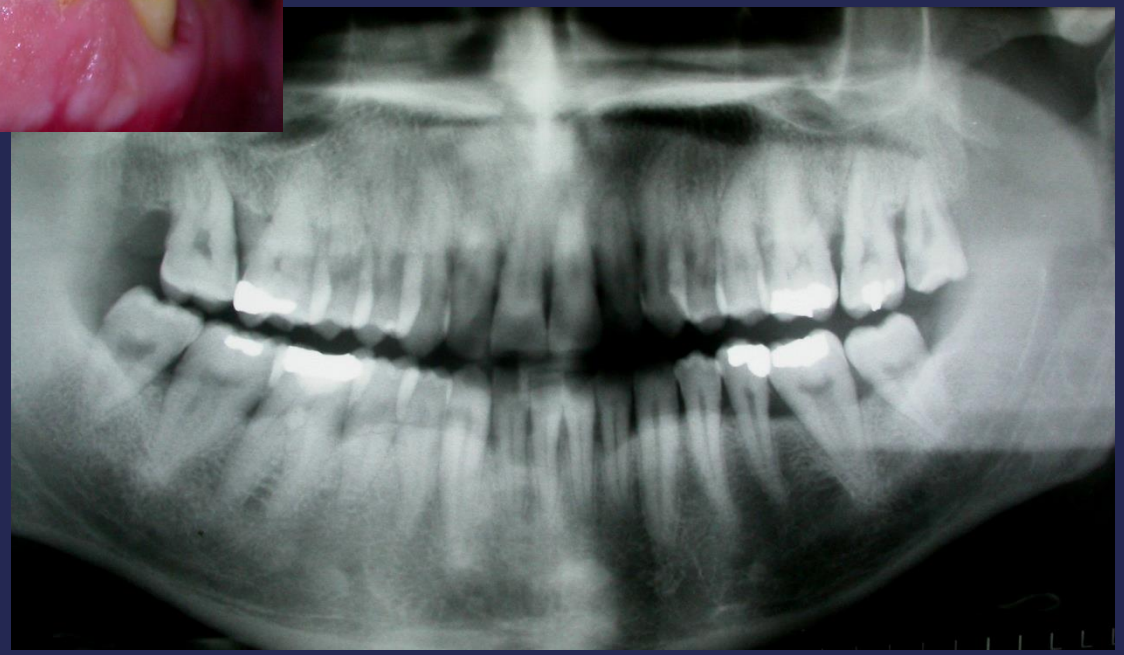


While inflammation is a critical protective mechanism, an aberrant inflammatory response associated with cytokines such as IL- 1, IL-6, IL-8, TNFa and arachidonic acid metabolites (eg PGE2) is seen in periodontitis patients. This promotes the production and release of matrix metalloproteinases by inlammatory and tissue cells, and also stimulates osteoclast activity.



Host

Host



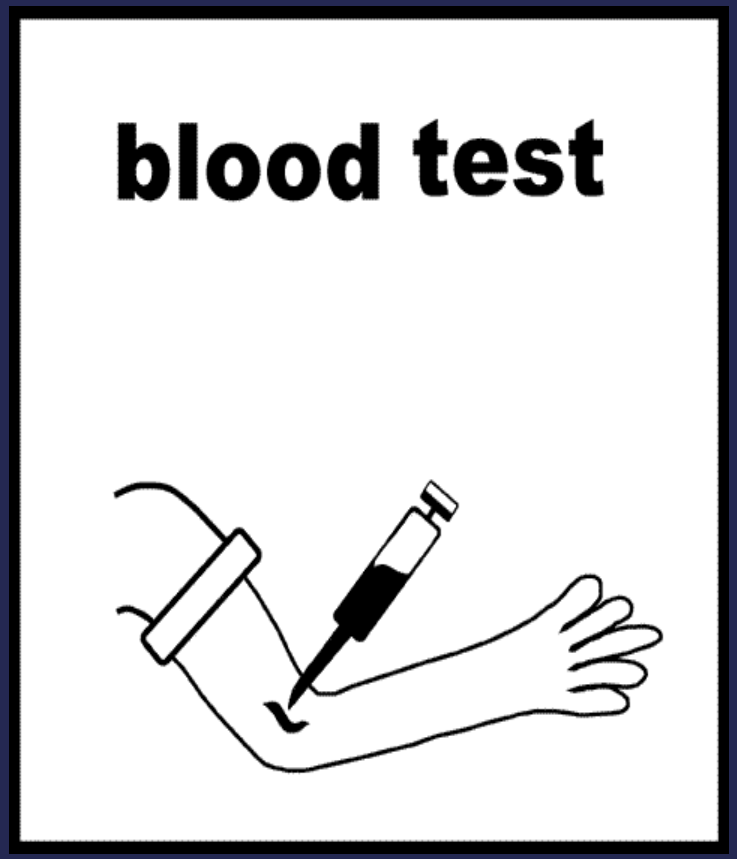
Genetics

- Michalowicz et al (2000) looked at a range of clinical measures in monozygous and dizygous twins.
- Chronic periodontitis was estimated to have approximately 51% hereditability, and this was unaltered after adjusting for behavioural covariates.
- No good evidence of heritability for gingivitis

Marazita (94, 04)

- “In the U.S population, aggressive periodontitis is typically inherited as an autosomal dominant trait with reduced penetrance. The clinical message is that the risk for offspring and siblings of patients affected with aggressive periodontitis approaches 50%

IL-1 Genotype Testing – Kornman 02



Host Modulation

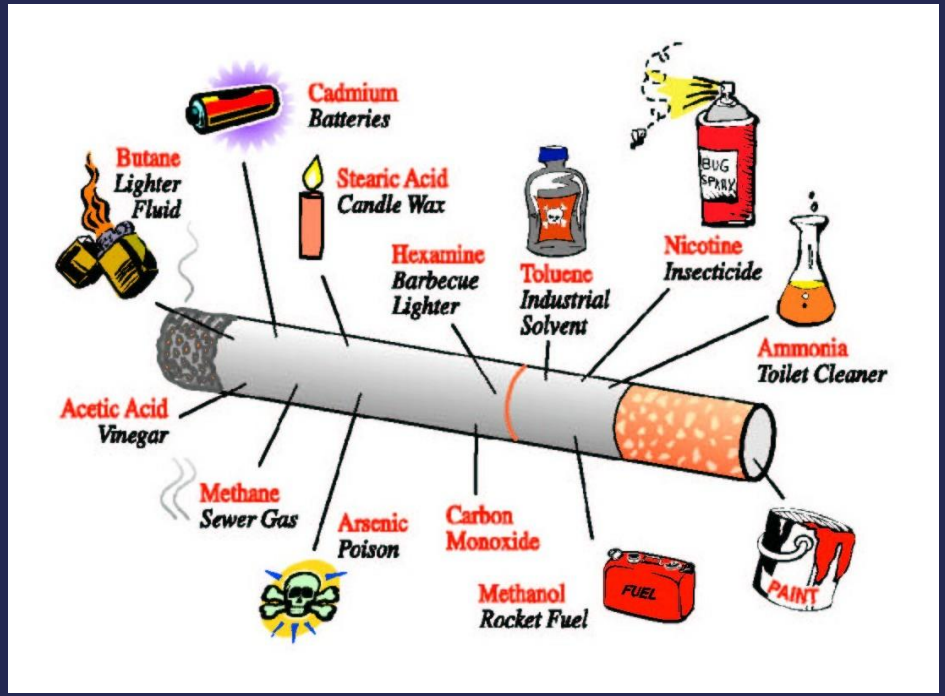
- Anti-inflammatory Drugs (NSAIDs)
- Matrix Metalloproteinase Inhibitors – low dose doxycycline
- Omega 3s
- Resolvins – very promising early results

1)Bacteria

2)Host

3)Environmental Influences

Environmental Risk Factors



Smoking

- ‘Smokers have more bone loss, deeper pockets and more calculus than non smokers, but the same amount of plaque and less clinical evidence of inflammation (American Academy of Periodontology, 2001).
- Smoking dramatically alters immune cellular response, tissue vascularity and elasticity and wound healing.

Smoking

- The majority of patients in periodontal practices are current or former smokers (Haber and Kent 92)
- Currently 18% of Australians smoke

Smoking

Smoking

Diabetes

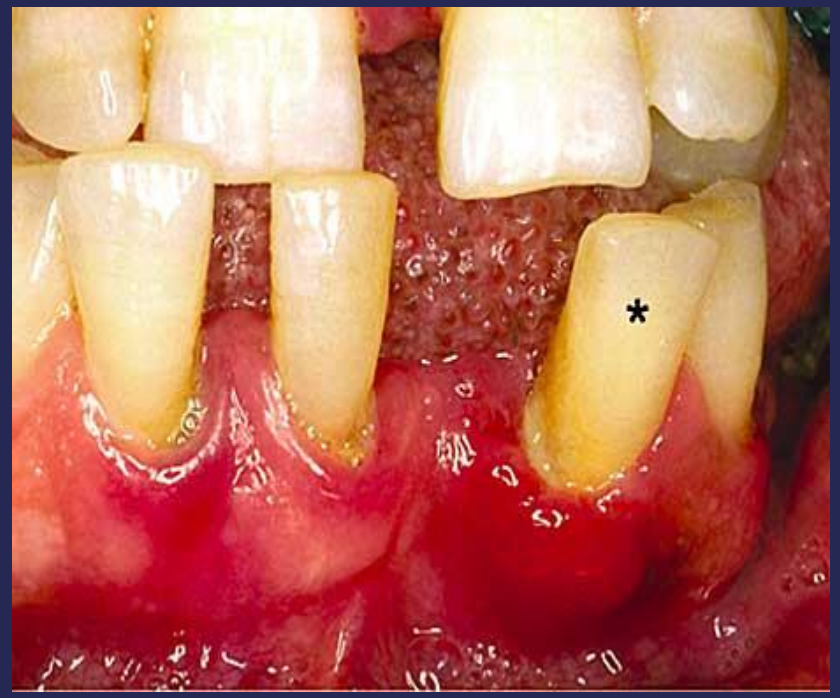
It is estimated that nearly one million Australians are diabetic, and almost half are unaware they have the condition.

Diabetes

- The incidence of periodontitis increases among diabetic subjects
- More severe
- Acute periodontal abscesses are more common
- Two way relationship, advanced uncontrolled periodontitis makes achieving diabetic control more difficult

Diabetes

- Uncontrolled diabetics are particularly difficult to treat, and make up a significant percentage of downhill patients in my practice
- Adjunctive antibiotics
- Very close maintenance



Stress

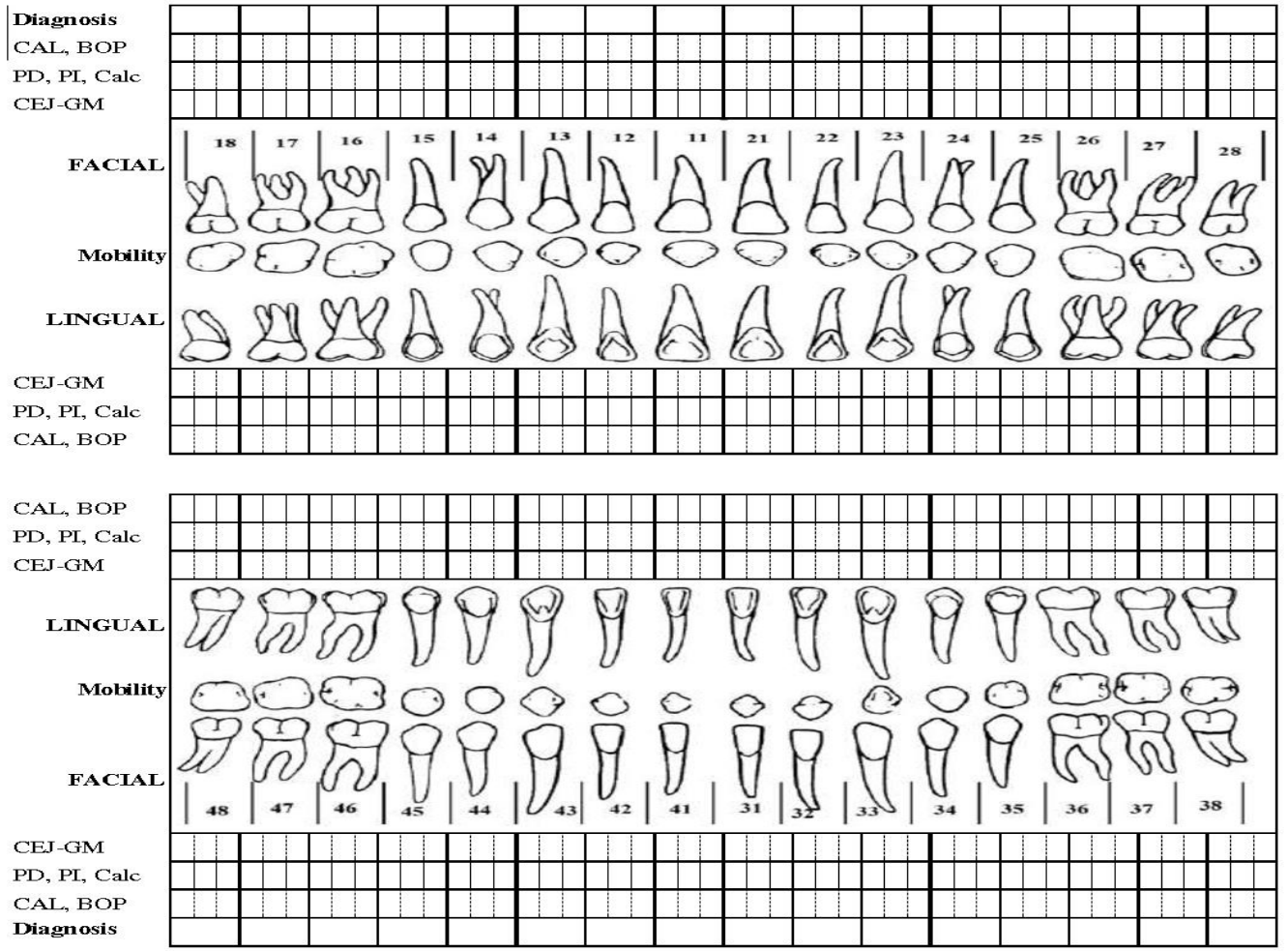
Alcohol

Diagnosis

PERIODONTAL CHART

PATIENT NAME: _____ FILE NO.: _____ DATE: _____

☐ Pre-treatment ☐ Re-evaluation ☐ Recall maintenance



GM- Gingival Margin. **CAL-** Clinical Attachment Loss. **CEJ-** Cementoenamel Junction. **PD-** Probing Depth
PI- Plaque, if presents put *. **Calc-** Calculus, if presents put *. **BOP-** Bleeding on probing, if presents put red

Plaque Index ☐ **Bleeding Index** ☐

Periodontal Diagnosis:

Supervisor's Signature

Should I Try to Save This Tooth?

The Natural Function of Teeth

- Aesthetic Function
- Phonetic Support
- Lip and Cheek support

- Proprioceptive Input
- Thermal Input
- Protective Reflex actions through the periodontal ligament and its related innervation
- Masticatory Function

Natural Feel

Comparative Tactile Sensation

- Trulsson et al (98) compared the food holding and biting behaviour in two separate groups:
- Subjects with natural teeth;
- Subjects with implant-supported fixed prostheses opposing each other.

- The task for the subjects was to hold half of a peanut between incisor teeth for 3 seconds, then split the peanut with the front teeth.

Comparative Tactile Sensation - Results

- The implant group produced 3 to 4 times more force to hold the peanut than the natural teeth group.
- Subjects with implants dropped the peanut 8 times more often than the subjects with natural teeth.

The authors concluded that periodontal receptors play a significant role in modulating "the level, direction, and point of attack on forces used to hold and manipulate food between the anterior teeth. Moreover, other types of mechano-receptors cannot fully compensate for the loss of periodontal receptors."

Sensory Innervation – ‘Natural Feel’

- Implant-supported prostheses do not fully restore all the functionality of natural teeth.
- There are significant differences in the patient’s perception of the thickness, hardness, and temperature of substances placed inter-occlusally; and the lack of sensory input from the periodontal ligament affects the masticatory muscles’ ability to modulate forces when manipulating food.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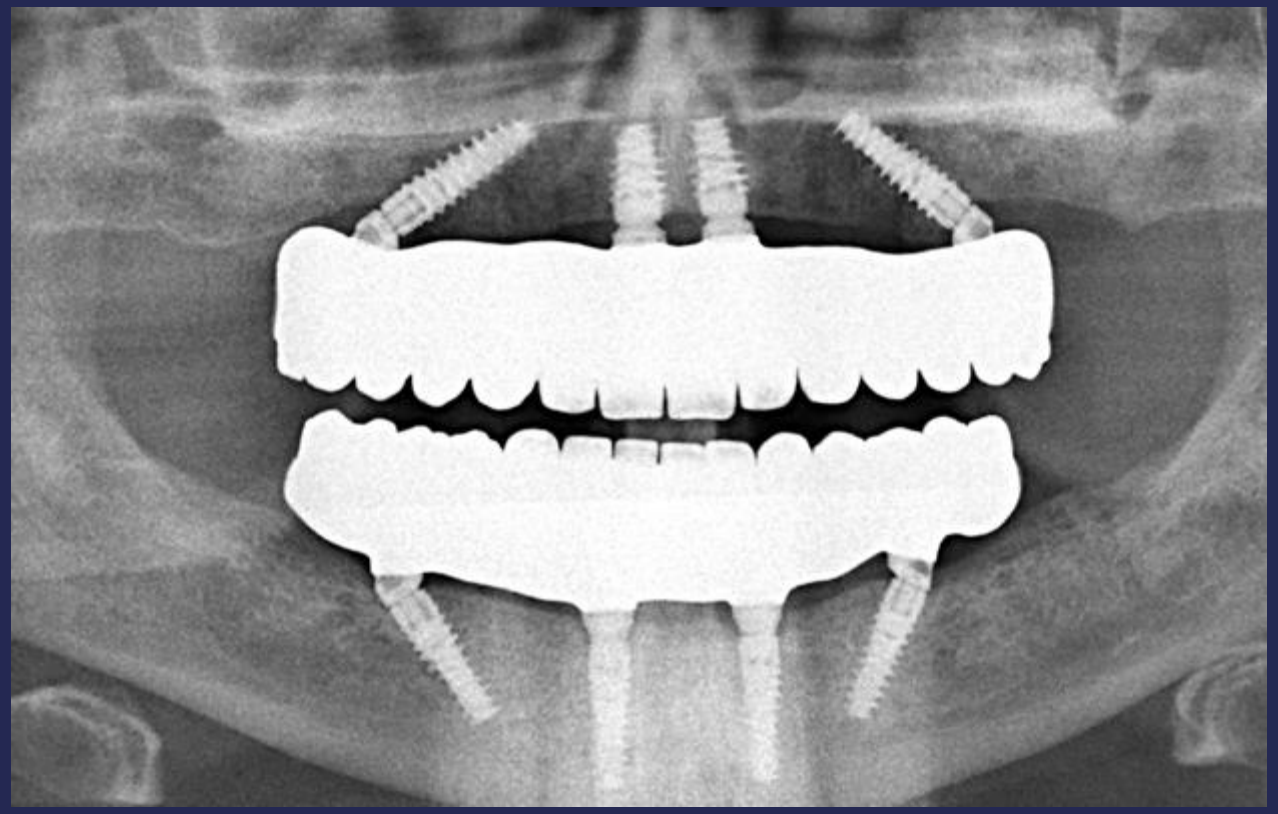


Saving the Tooth

- 1) Endodontically treatable
- 2) Achieve periodontal health with adequate remaining periodontal support
- 3) Restorable - with sufficient supporting tooth structure to allow for a good prognosis over the longer time frame and leaving the gingival tissues in health

Acceptable Aesthetics

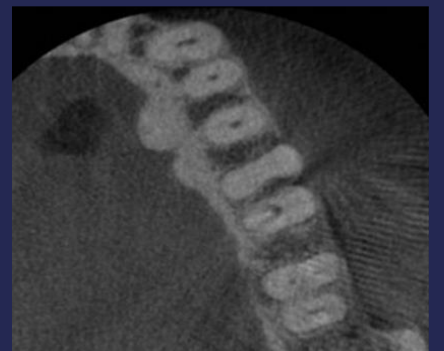
Within context of overall functional Tx Plan

1) Factors Influencing Endodontic Success

- Treatment of a vital pulp > Necrotic and Infected Pulp

  Sjogren et al (90) found that after 8-10yrs endodontic success was 96% when no apical pathology was initially present, 86% with apical pathology initially.

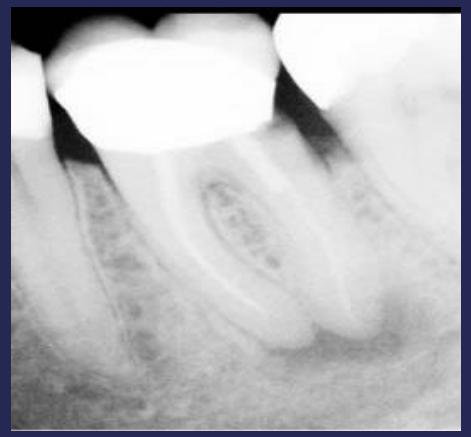
- Obturation - (Sjogren et al) Best success in the Tx of necrotic cases with apical periodontitis when the obturation ends within 0-2 mm of radiographic apex (94%).
  - Underfills are less successful (68% when >2mm from apex)
  - Overfills also less successful (76%)



Factors Influencing Endodontic Success

- Re-treatment has a lower success rate.

Sundqvist et al (98) selected 54 root-filled teeth with persisting periapical lesions for re-treatment. The authors suggested that looking at the literature when teeth are treated by root canal therapy the success rate is generally in the vicinity of 85% to 90%. In their endodontic re-treatment study, the success rate dropped to 74% (up to 5yrs)



Factors Influencing Endodontic Success

- Restorative Success (Ray and Trope 95)

Radiographic exam of 1010 endodontically treated teeth restored with a permanent restoration. The quality of the coronal restoration was significantly more important than the quality of the endodontic treatment for the presence of apical periodontitis.

Endodontic Survival

- Iqbal & Kim (2007) meta-analysis restricted their outcome measure to ‘survival’.
- 13 Endodontic Studies, 55 Implant Studies
- Survival rate of 94% for endodontics and 96% for implants at 5 years (no statistical significance in difference).

2) Periodontal Management

Initial Consultation March 05

When are teeth Periodontally Hopeless?

Mobility – in the absence of excessive parafunctional forces shows the equilibrium between natural loading of a particular tooth and its periodontal support.

- Grade II+ and Grade III mobility – extract
- Grade II mobility – questionable prognosis however worth assessing response to initial treatment. For lower incisor teeth this sometimes include splinting
- Perio-Endo lesions – generally poor prognosis, often teeth are better extracted early
- Advanced attachment loss with positioning that prevents adequate cleaning (eg impacted teeth, supra-erupted teeth). Advanced Furcation involvement also an influencing factor on this decision.
- Multiple significant pathologies/disease predisposing factors associated with the tooth

Hirschfeld and Wasserman 1978

Specialist Periodontal Private Practice

600 treated and well maintained patients

Mean follow up time over 22 years

8% of teeth were lost

The well-maintained group (0-3 teeth lost) 83.2% of participants

Downhill group (4-9 teeth lost) 12.6% of participants

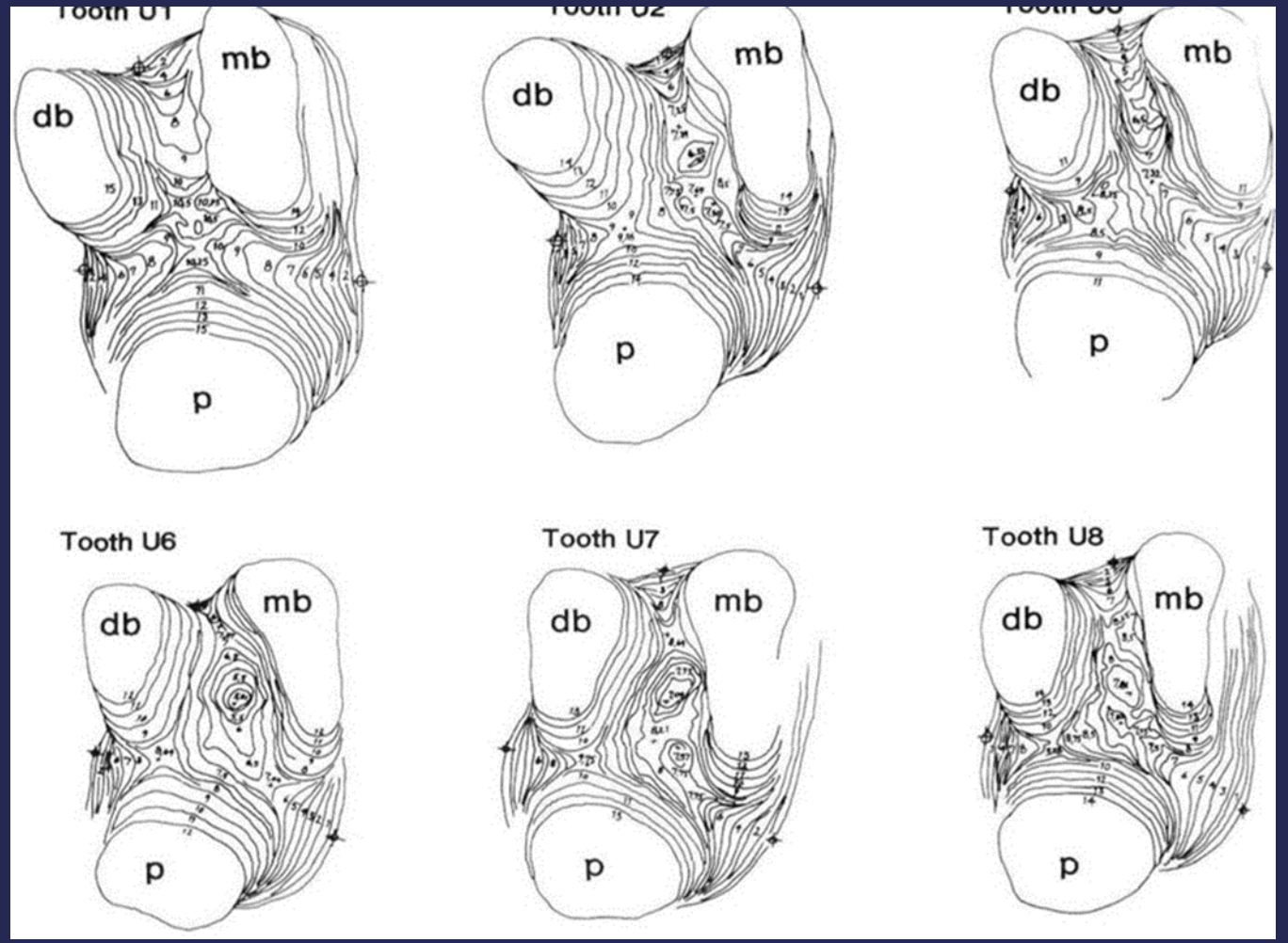
Extreme Downhill group (10-23 teeth lost) 4.2% of participants

Hirschfeld and Wasserman (78)

- Teeth most commonly lost in order:
- 1st – Maxillary second molar
- 2nd – Maxillary first molar
- 3rd – Mandibular second molar
- 4th – Mandibular first molar
- 5th – Maxillary first premolar

Furcations

- In total 8% of all teeth were lost. In comparison 33% of all maxillary molars with pre-treatment furcation involvement were lost and 29% of mandibular molars with pre-treatment furcation involvement.



Furcations

- Over 82% of the furcation involved molars lost were lost in 17% of patients (downhill and extreme downhill groups).
- 86% of molars in the well maintained groups lasted to the end of the study.

Extract Early To Save Bone?

- A general ‘early extraction’ principle sacrifices a lot of ‘tooth years’. Most furcation involved molars can be saved in the long term with thorough initial care, good oral hygiene and regular periodontal maintenance.

- If teeth are lost, in the vast majority of patients implant treatment will still be possible (short implants, moderately rough surfaces) although in some cases additional grafting may be required.

Peri-Implantitis

- Disease Process Extremely Similar to Periodontitis

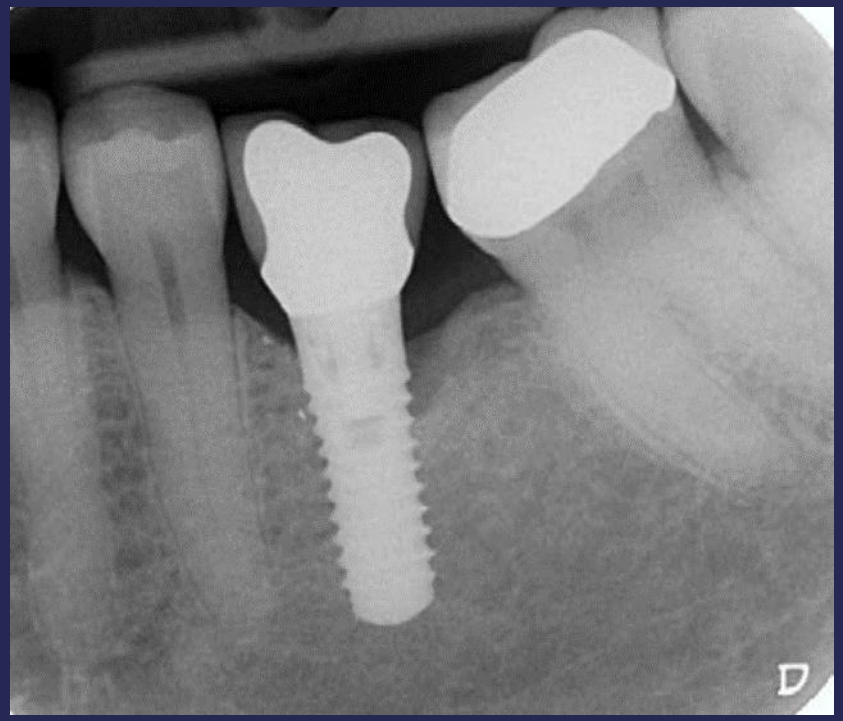
Mombelli et al 2012 - Review

- The prevalence of peri-implantitis seems to be in the order of 10% of implants 10 years after implant placement and 20% of implants 20 years after implant placement.

Risk Indicators for Peri-Implantitis (Heitz-Mayfield et al 12) – Odds Ratios

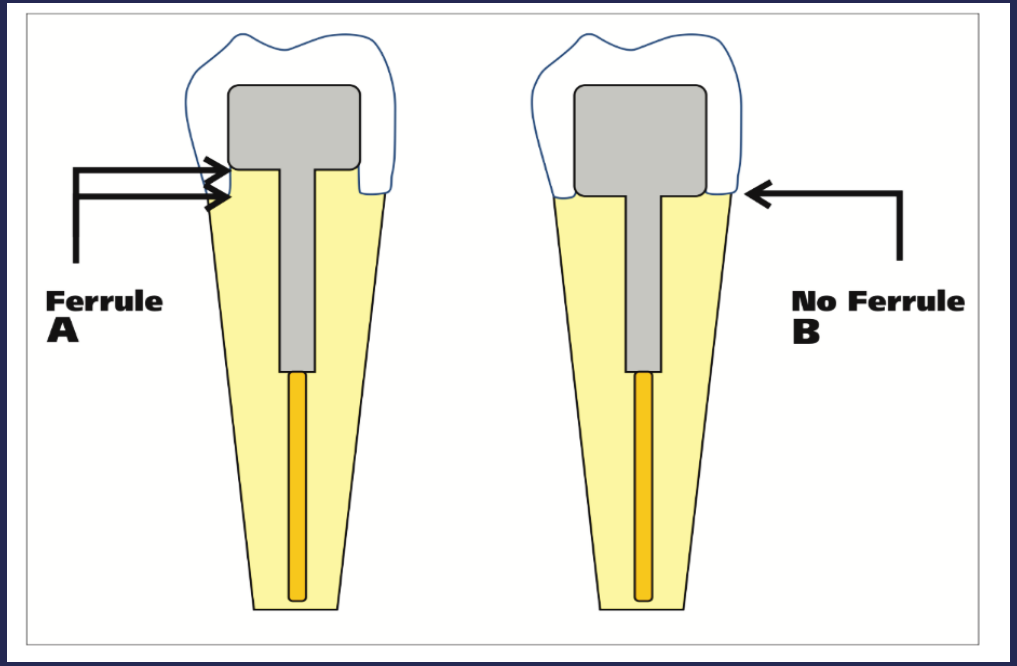
- Smoking = 3.6
- History of treated periodontitis = 4.7
- Residual pockets >5mm with BOP = 5
- Lack of SPT = 5.9
- Very Poor OH = 14.3

- Much higher risk of peri-implantitis in patients with strong susceptibility to periodontitis.



3) Restorative Success

- Supporting coronal dentine of at least 1.5mm in height is needed to provide a ferrule necessary for predictable retention form, even with a post (Sorensen and Engelman 1990).



Restorative Success

- The occlusal load the tooth will receive is a modifying factor, with greater than normal occlusal forces necessitating an increase in resistance form (O'Neal and Butler 2002).
- Teeth that have had post spaces prepared more than once commonly have minimal width to the internal dentine walls. This is also a problem in narrow, thin root forms such as the mandibular incisors, maxillary lateral incisors and maxillary first premolars.

Crown Lengthening

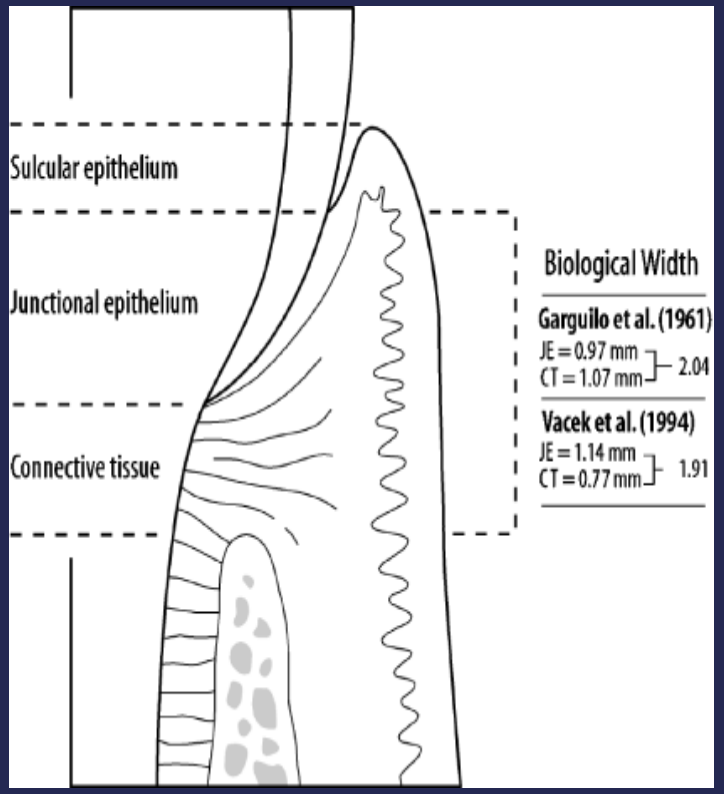
- Provides increased utilisable tooth structure
- Allows for achievement of Ferrule Effect
- Facilitates easier access to apical margins and in non aesthetic areas often allows for supragingival marginal placement

Biologic Width

- Gargiulo et al (61) in an autopsy study suggested a definite proportional relationship between

a) the connective tissue attachment

b) the junctional epithelium



Clinical Guidelines for Biologic Width

- In the vast majority of cases, placement of the restorative margin needs to be at least 2.5-3mm above the alveolar crest
- If margins to be placed subgingivally, ideally 0.5mm subgingivally in normal tissue types, following the architectural contour of the gingival margin

Impingement of Biologic Width

- Gunay et al (2000) looked at teeth prepared within 1.5mm of the alveolar crest and restored in 41 patients who were followed for at least two years.
- At all margins ≤1.5mm to the crest there was persistent tissue inflammation and bleeding on probing over the course of the study and on average 1.2mm of radiographic bone resorption. In thin tissue types this was usually manifest as recession.

Crown Lengthening

- When is it possible?

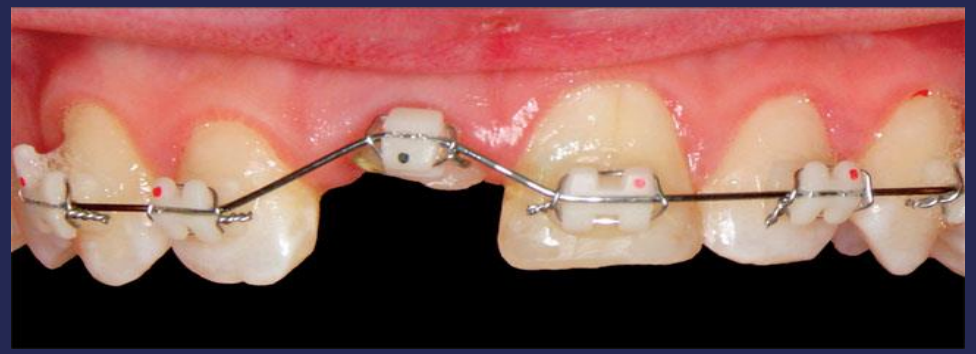
1) Fracture must be within the coronal third of the root. Crown lengthening is generally not appropriate when more than 5mm of tissue removal/recontouring is required

2) Limitations

- Mobility
- Presence of furcation entrances at multi rooted teeth. If bone removal is required to expose more than 2mm of the furcation entrance in a vertical dimension crown lengthening is not indicated

Crown Lengthening – Limitations/Contraindications

- In anterior regions patients with a high smile line with a want for optimal gingival aesthetics.
- Crown Lengthening on palatal aspects in patients with thick palatal ridges and shallow palatal vaults
- Poor oral hygiene post surgery results in less predictable healing and an increased risk of infection.



Crown Lengthening Surgery

- Predictable
- Healing – 6 weeks gingivectomy, 8 weeks standard flap, 12 weeks apically re-positioned flap
- Useful in the management of root caries and ECIR lesions in the coronal third of the root

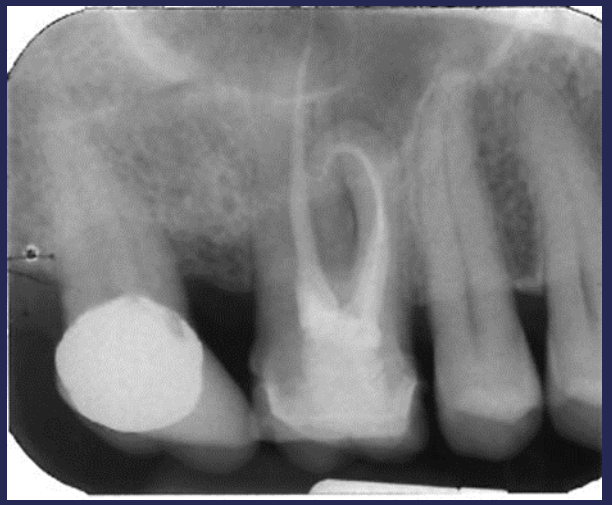
Root Resection

Root Resection

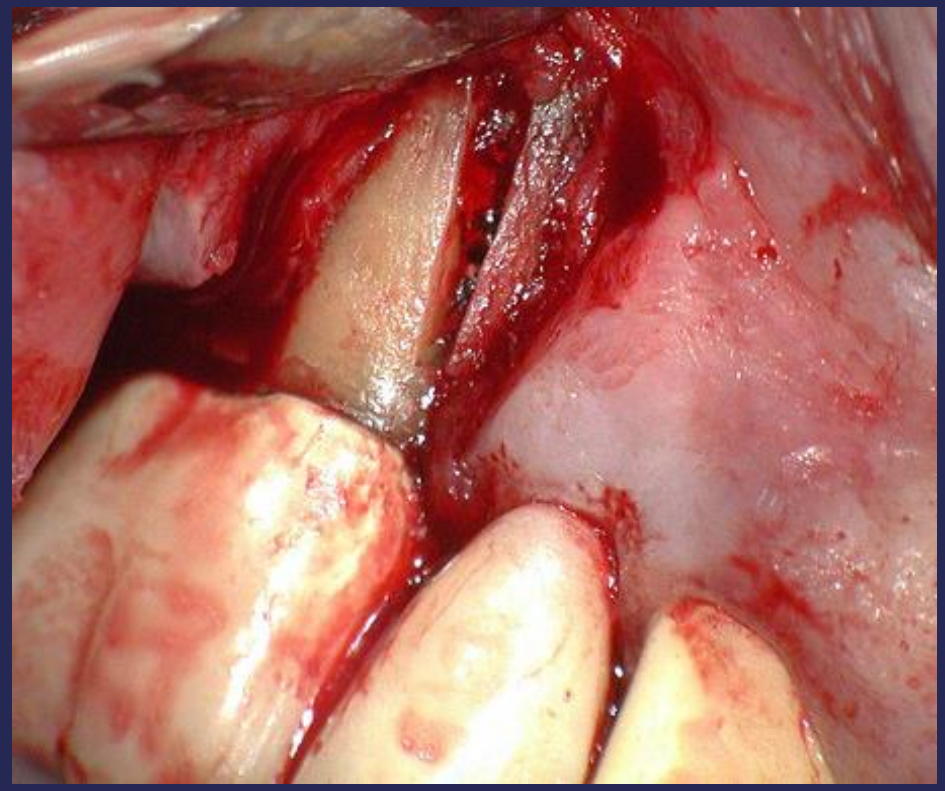
- Maxillary molars, MB or DB root
- Palatal root surface area too great (up to 45%) – High risk of fracture of remaining roots
- Low success rate at mandibular molars

Root Resection – Park et al

- Factors Influencing the Outcome of Root-Resection Therapy in Molars: A 10-Year Study (Park et al 2009)
- Over the past 10 years, 102 of 342 cases (29.8%) failed.
- To achieve a good result, it was important that the remaining roots had >50% bone support.
- High standard of RCT with intact coronal restoration



Root resection



Should I try to save this tooth - Summary

- Most patients have an inherent want to keep their own teeth as opposed to replacement. Physiologically there are advantages to this.
- Periodontal Treatment and Endodontic Treatment is predictably successful when cases are well selected. There are risks which the patient must be aware of and accept.
- Restorability often a difficult decision. Crown lengthening can be very helpful
- Definition of Success

Thanks!

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