

Faste protesers ytre form
Seminar, videreutdanningen i protetik, 26/2/1992
Asbjørn Jokstad & Knut Eide

Faste protesers komponenter består av:

Kroner --- Pilarer ---- Ekstensjons eller mellomledd

De ytre former vil være avgrenset av:

I. Okklusalflaten

II De vertikale flater

III. Den gingivale relasjon

De ytre former må utformes med hensyn til:

1. Materialtekniske krav

2. Estetisk passform

3. Biologiske krav

Spesielle hensyn vil gjelde for hver enkelt komponents former.

Seminaret tar sikte på å diskutere forholdene slik de er beskrevet i de kliniske rutiner i forhold til ulike typer studier :

Histopatologiske

 Eksperimentelle design

 Mennesker

 Dyr

Kliniske

 Eksperimentelle & Observasjonelle (epidemiologiske)

 Plaqueindeks

 Gingivalindeks

 Lommedybde

 Loss of attachment

 Røntgenologisk bentap

 Mengde exudat fra gingivallomme

 Leucocytinnhold i exudat fra gingivallomme

 Bakteriesammensetningen i plaque

En litteraturliste med relevante referanser til seminaret blir distribuert.

Referanselisten inkluderer 2-3 sentral arbeider fra før 1970, samt en relativt komplett liste over arbeider siden 1970.

I. Okklusalflaten

Materialtekniske krav

- Materialvalg

- Dimensjonering

 - Broledd, bucco-lingual bredde

Estetisk passform

- Sulcusmorfologi

Biologiske krav

- Optimal artikulasjon, dvs ingen interferens

- Belastning på resttannsettet

 - Valg av pilarer, omtales av Bjørdal & Saxegaard d. 8/4

- Belastning på periodontiet

 - Høyde

 - Broledd, buccolingual bredde

 - lengde på ekstensjonsledd

Kliniske studier:

Eksperimentelle

- Nyman et al, 1975

Observasjonelle

- Randow et al. 1986

- Kleber et al. 1988

II. De vertikale flater

Materialtekniske krav

- Materialvalg
- Dimensjonering
 - Broledd, axio-cervicale lengde

Estetisk passform

- Lengde & Bredde
- Akse & Prominens
- Konveksitet mesialt-distalt & axio-cervicalt
- Konkavitet proksimalt
 - Broledd, axio-cervicale lengde

Biologiske krav

- Estetisk passform og effekt på gingiva/periodontiet
- Kontaktpunkt og effekt på gingiva/periodontiet

Histopatologiske studier:

- Observasjonelle design**
 - Koivumaa & Wennström 1970
 - Kandelmann et al 1974

Kliniske studier:

- Eksperimentelle**
 - Pilot 1972
 - Youdelis et al 1973
 - Silness & Ohm, 1974
- Observasjonelle (epidemiologiske)**
 - Larato 1971
 - Hüttner 1971
 - Hancock et al 1980
 - Grasso et al. 1984

III. Den gingivale relasjon

Materialtekniske krav/ Estetisk passform & Biologiske krav

Materialvalg

Prepareringsalternativ - (diskutert av Kristiansen & Støvne 11/3)

Biologiske krav

Axiocervicale beliggenhet av kronekant

Effekt på gingiva/periodontiet

Effekt på kariesrisiko

Broledd

Utforming gingivalt

Utforming proksimalt

Histopatologiske studier

Ekperimentelle design

Mennesker

Wærhaug 1953

Koivumaa & Wennström 1970

Dragoo & Williams 1982

Tarnow et al. 1986

Dyr

Wærhaug 1953

Marcum 1967

Karlsen 1970

Smales et al. 1979

Kliniske studier:

"Ekperimentelle" design

Silness 1970a,b,c, 1974, Silness & Ohm 1974

Bergmann et al 1971

Richter & Ueno 1973

Kröncke 1973

Newcomb 1974

Reingli 1974a,b, Mörmann et al. 1974

Valderhaug & Birkeland 1976, & Heløe 1977, 1980

Kerschbaum T Meier F. 1978

Nyman & Lindhe 1979

Lang et al 1983

Müller 1986

Flores de Jacoby et al. 1989

Reichen-Graden & Lang 1989

Bader et al. 1991a

Observasjonelle design (epidemiologiske)

Rantanen 1970

Fuhr et al 1971

Løe et al 1978

Koth 1982

Rohner et al. 1983

Grasso et al. 1984

Orkin et al 1987

Freilich et al. 1990

Felton et al. 1991

Kleber et al 1991

Bader 1991b

Experimentelle studier

- Wærhaug J. 1953 Tissue reactions around artificial crowns. *J Periodontol* 24:172-185
- Marcum JS. 1967 The effect of crown marginal depth upon gingival tissue. *J Prosthet Dent* 17:479-487
- Karlsen K. 1970 Gingival reactions to dental restorations. *Acta Odontol Scand* 28:895-904
- Koivumaa KK Wennström A. 1970 A histological investigation of the changes in gingival margins adjacent to gold crowns. *Odont Tid* 68:359-373
- Silness J. 1970 Periodontal conditions on patients treated with dental bridges. Part 1. *J Periodont Res* 5: 60-68. Part 2. The influence of full and partial crowns on plaque accumulation, development of gingivitis and pocket formation. *J Periodont Res* 5:219-224. Part 3. The relationship between location of the crown margins and the periodontal conditions. *J Periodont Res* 5:225-229
- Bergman B Hugoson A Olsson CA. 1971 Periodontal and prosthetic condition in patients treated with removable partial dentures and artificial crowns. *Acta Odontol Scand* 29:621-638
- Pilot T. 1972 Morphology of the interdental papillae during restorative dentistry 76 procedures. A photogrammetric method of investigation [Thesis]. *Ned Tijdschr Tandheel* 79 Sup 7:Pp
- Richter WA Ueno H. 1973 Relationship of crown margin placement to gingival inflammation. *J Prosthet Dent* 30:156-161
- Kröncke A. 1973 Der füllungs- und kronenrand aus parodontologischer sicht. *Dtsch Zahnärztl Z* 28:161-165
- Youdelis RA Weaver JD Saphos S. 1973 Facial and lingual contours of artificial complete crown restorations and their effects on the periodontium. *J Prosthet Dent* 29:61-66
- Renggli HH. 1974 Auswirkungen subgingivaler approximaler füllungsänder auf den entzündungsgrad der benachbarten gingiva (Eine klinische studie). Part 1. *Schweiz Monatsschr Zahnmed* 84(1):1-18
Part 2. *Schweiz Monatsschr Zahnmed* 84(2):181-214 & Mörmann W, Regolati B, Renggli H. 1974. Gingival reaction to well-fitted subgingival proximal gold inlays. *J Clin Periodontol* 1:120-125
- Silness J. 1974 Periodontal conditions in patients treated with dental bridges. IV. The relationship between the pontic and the periodontal condition of the abutment teeth. *J Periodontol Res* 9:50 &
- Silness J Ohm E. 1974 V. Effects of splinting adjacent abutment teeth. *J Periodontol Res* 9:121
- Newcomb GM. 1974 The relationship between the location of subgingival crown margins and gingival inflammation. *J Periodontol* 45:151-154
- Nyman S Lindhe J Lundgren D. 1975 The role of occlusion for the stability of fixed bridges in patients with reduced periodontal tissue support. *J Clin Periodontol* 2:53-66
- Valderhaug J Birkeland JM. 1976 Periodontal conditions in patients 5 years following insertion of fixed prostheses. *J Oral Rehabil* 3:237-243 & Valderhaug J Heløe LA. 1977 Oral hygiene in a group of supervised patients with fixed prostheses. *J Periodontol* 48(4):221-224
- Kerschbaum T Meier F. 1978 Intraindividuelle unterschiede am marginalen parodontie bekronter und nicht bekronter, topographisch identischer zähne. *Dtsch Zahnärztl Z* 33:499-504
- Nyman S Lindhe J. 1979 A longitudinal study of periodontal and prosthetic restorations. *J Clin Periodontol* 5:163-169
- Smales RJ, Nixon KC, Joyce KP. Effects of subgingival restorations in beagle dogs. Part II. Gingivitis. *J Prosthet Dent* 41:522-527
- Valderhaug J. 1980 Periodontal conditions and carious lesions following the insertion of fixed prostheses: a 10-year follow-up study. *Int Dent J* 30(4):296-304
- Dragoo MR Williams GB. 1981 Periodontal tissue reactions to restorative procedures. *Int J Periodontal Rest Dent* 1(1): 8-23 & Part II. *Int J Periodontal Rest Dent* 2(2):35-45
- Lang NP Kiel RA Anderhalden K. 1983 Clinical and microbiological effects of subgingival restorations with overhanging or clinically perfect margins. *J Clin Periodontol* 10:563-578
- Müller HP. 1986 The effect of artificial crown margins at the gingival margin on the periodontal conditions in a group of periodically supervised patients treated with fixed bridge. *J Clin Periodontol* 13:97-102
- Tarnow D Stahl SS Magner A Zamzok J. 1986 Human gingival attachment responses to subgingival crown placement - marginal remodelling. *J Clin Periodontol* 13:563-569
- Flores-de-Jacoby L Zafiroopoulos GG Ciancio S. 1989 The effect of crown margin location on plaque and periodontal health. *Int J Periodontal Rest Dent* 9(3):197-205
- Reichen-Graden S Lang NP. 1989 Periodontal and pulpal conditions of abutment teeth. Status after 4-8 years following the incorporation of fixed restorations. *Schweiz Monatsschr Zahnmed* 99(12):1381-1385
- Bader J Rozier RG McFall WT. 1991 The Effect of Crown Receipt on Measures of Gingival Status. *J Dent Res* 70(10):1386-1389

Observasjonelle studier

- Rantanen T. 1970 A control study on crowns and bridges on root filled teeth. Suomen Hammaslääk Toimit 66:275-88
- Larato DC. 1971 Relationship of food impaction to interproximal intrabony lesions. J Periodontol 42:237
- Hüttner G. 1971 Nachuntersuchungen von kronen und brückenzahnersatz in bezug auf den kronenrand und das marginale parodontium. Dtsch Zahnärztl Z 26:724-729
- Fuhr K Kares K Siebert G. 1971 Nachuntersuchungen festsitzende ersatzes. Dtsch Zahnärztl Z 26:716-724
- Kandelmann D Nally JN Meyer JM. 1974 Controles cliniques et radiographique de 112 cas de protheses conjointes. Schweiz Monatsschr Zahnmed 84(11):1248-
- Løe H Ånerud Boysen H et al. 1978 The natural history of periodontal disease in man. The rate of periodontal destruction before 40 years of age. J Periodontol 49:607- 620
- Hancock EB Mayo CV Schwab RR Wirthlin MR. 1980 Influence of interdental contacts on peridodontal status. J Periodontol 51:445-449
- Becker CM, Kaldahl WB. 1981 Current theories of crown contour, margin placement and pontic design. J Prosthet Dent 45:268-277
- Garner FM. Margins of complete crowns - Literature review. J Prosthet Dent 48:396-400
- Koth DL. 1982 Full crown restorations and gingival inflammation in a controlled population. J Prosthet Dent 48:681-685
- Rohner F Cimasoni G Vuagnat P. 1983 Longitudinal radiographic study on the rate of alveolar bone loss in patients of a dental school. J Clin Periodontol 10:643-651
- Grasso JE Nalbandian J Sanford C Bailit H. 1984 Effects of restorative quality on periodontal health. J Prosthet Dent 53:14-19
- Randow K Glantz PO Zöger B. 1986 Technical failures and some related clinical complications in extensive fixed prosthodontics. Acta Odontol Scand 44:241-255
- Orkin DA Reddy J Bradshaw D. 1987 The relationship of the position of crown margins to gingival health. J Prosthet Dent 57(4):421-424
- Kleber BM Otto G Wiedemann E. 1988 Der einfluss des kontaktmusters von amalgamfüllungen auf das marginale periodontie. Stomatol DDR 38(8):520-524
- Freilich M, Niekrash C, Katz R, Simonsen R. (1990) The effects of Resin-bonded and conventional fixed partial dentures on the periodontium: Restoration type evaluated J Am Dent Assoc 121:265-269
- Kleber BM et al. 1991 Der einfluss marginaler und submarginaler restaurationsrnder auf das parodontale gewebe. Dtsch Stomatol 41(1):35-37
- Bader JD Rozier RG McFall WT Ramsey DL. 1991 Effect of crown margins on periodontal conditions in regularly attending patients. J Prosthet Dent 65(1):75-79
- Felton DA Kanoy BE Bayne SC Wirthman GP. 1991 Effect of in vivo crown margin discrepancies on periodontal health. J Prosthet Dent 65:357-364

Oversiktsartikler

- Lytle JD Skurow HM. 1971 The interproximal embrasure. *Dent Clin North Amer* 15:641
- Valderhaug J. 1972 Prepareringsgrensens beliggenhet - krone/bro synspunkter. *Nor Tannlegeforen Tidsskr* 82(7):387-390
- Ramfjord SP. 1974 Periodontal aspects of restorative dentistry. *J Oral Rehabil* 1:107-126
- Leon AR. 1977 The periodontium and restoration procedures. A critical review. *J Oral Rehabil* 4(2):105-117
- Silness J. 1977 Periodontale effekter av faste krone/broproteser. *SSPD Rapport 1977-09-20*
- Lindhe J Nyman S. 1977 The role of occlusion in periodontal disease and the biological rationale for splinting in treatment of periodontitis. *Oral Sci Rev* 10:11-43
- Maynard J Wilson R. 1979 Physiologic dimensions of the periodontium significant to the restorative dentist. *J Periodontol* 50:170-174
- Reinhardt RA. 1979 Guidelines for locating the cervical margins of dental restorations. *Oper Dent* 4:90-99
- Silness J. 1980 Fixed prosthodontics and periodontal health. *Dent Clin North Amer* 24:317-329
- Tjan AH Freed H Miller GD. 1980 Current controversies in axial contour design. *J Prosthet Dent* 44:536-540
- Nevins M. 1982 Interproximal periodontal disease- The embrasure as an etiologic factor. *Int J Periodontol Rest Dent* 2(6): 9-27
- Valderhaug J. Biologiske følgestilstander etter faste krone/bro erstatninger. I: *Odontologi '83*. København: Munksgaard. 159-170
- Steffensen B. 1983 Prepareringsgrænsens cervikale placering. En litteraturoversigt. *Tandlægebladet* 87:389-396
- Riethe P. 1984 Welche füllungsmaterialien sind im gingivalen bereich vertretbar ? *Dtsch Zahnärztl Z* 39:589-598
- Nevins ML Skurow HM. 1984 The intracrevicular restorative margin, the biologic width, and the maintenance of the gingival margin. *Int J Periodontol Rest Dent* 4(3):30-49
- Parma-Benfenati S Fugazzotto PA Ruben MP. 1985 The effect of restorative margins on the post surgical development and nature of the periodontium. *Int J Periodontol Rest Dent* 5(6):31-51

I de kliniske rutiner angis prinsipper for faste protesers ytre form på ulike steder:

Side 14, pkt 9. Prøving av krone

Kontroller approssimale kontakter og okklusjonskontakten i IP

Kontroller okklusjonskontakten i pro- latero- og mediotrusjon

Kontroller form med henblikk på estetikk og hygienevennlighet

Side 15, pkt 11. Kontroll før godkjenning

* Dersom ikke spesielle forhold tilsier diastemata, skal kronen ha fast kontakt mot nabotenner i den insisale/okklusale del av approssimalflaten, og det skal være god føring for tannstikker/tråd/interdentalbørste.

* Vestibulære flater skal ha kurvatur i harmoni med restttannsettet, eller være underkonturert i forhold til dette

* I IP og ved laterotrusjon skal dens antagonistkontakt være i harmoni med restttannsettet

* Unngå kontakt på kronen ved mediotrusjonsbevegelser.

Side 41, pkt 3,4,5 & 6. Tilpasning av kroner

3. Passform mot nabotenner

* Kontaktpunktene skal ligge høyt incisalt/okklusalt,

* med harmonisk krumning ned mot gingivalranden.

Approssimalrommet skal gi plass for interdentalpapillen og god styring for rengjøringsredskap (tanntråd, tannstikker eller interdentalbørste).

4. Passform mot gingiva

* Kronen skal ikke være overkonturert. Approssimal- vestibular og oralflatene skal ha krumning i harmoni med restttannsettet, eller skal være underkonturert i forhold til dette.

* Lengden skal passe eksakt med prep.grensen, men ha en viss tykkelse som tillater substansatap under sluttarbeid på laboratoriet.

5. Passform i okklusjon og artikulasjon

* Kroner skal ha kontakt med antagonist i interkuspidasjonsposisjon.

* Normalt skal de også ha pro- og laterotrusjonskontakt i harmoni med restttannsettet, men

* ikke mediotrusjonskontakt

6. Estetisk passform

* Hovedelementene i formgivningen er tannlengde, tannbredde, aksestilling, kuspevinkel/insisalkantens helning, kontaktpunktets beliggenhet, vestibulærflatens krumning vertikalt og horisontalt og dens prominens.

Side 18, pkt 13. Siste broprøve

* Kontroll/justering skal ta hensyn til følgende:

Anlegg mot alveolarkammens slimhinne

Festenes gingival tilslutning

Kontakt i IP

Kontakt ved pro- latero- og mediotrusjon

Form med henblikk på estetikk

Form med henblikk på hygienevennlighet

Okksual

Nyman har vist at med god hygiene spiller det mindre rolle hvordan okkl ser ut

Kleber fant ingen sammenheng mellom perio og "kvalitet2 på bitt

Randow- viste at faren for fraktur øker med forlengede sveveledd

Prox Contour

Wærhaug 1953 There is no such thing as a smooth transition between a dental restoration and the tooth, and plaque accumulates in the irregularities

Vanskelig å skille denne faktoren fra hygiene og plassering av kronekanter.

Larato 71 & Hüttner 71 viser at ved åpne kontakter økte perio.

Inadequate contour of the proximal part has been used as a criterion in quality evaluations (Table 7). On the other hand, it has not been established if there truly exists an optimal restoration contour.

The evaluation of the interproximal contacts and axial contours are often subjective judgements (Nuckles & Fingar, 1975). It is well known that poor interdental contact and excessively overcontoured restorations affect the periodontal status (Hancock et al, 1980).

It is uncertain how the size, the location (Pilot 1972, Hancock et al# 1980) and the quality (Soumi 1971) of the proximal contacts affect the gingiva ;

Grasso,Nalbandian 1984 Definite or positive parameters related to the restoration are the location of the contact and the axial contour of the restoration

Smooth surfaces

Vanskelig å skille denne faktoren fra hygiene og plassering av kronekanter.

Kandelmann et al. 1974 fant ingen forskjeller mellom "god" og dårlig kontur.

Koivumaa ea 1970 fant at overkontur repre et period risikimoment

* Mechanical trauma may stem from overcontouring of the crown, which prevails on the buccal surfaces (Youdelis et al# 1973),

Axiogingival

Histo

Wærhaug, 1956: Questioned earlier theories of mechanical irritation. Advocated instead that rough surfaces promoted the retention of plaque. Definite or positive parameters related to the restoration is the roughness of the restorative material

Marcum, 1967: Placed gold crowns with different marginal depths in 6 dogs. Found more inflammation when placed supragingivally. No criteria given to judge marginal fit, and no xray were taken

Karlsen, 1970: Used 2 dogs and 3 monkeys, cut crowns or small cl.V sub and supragingivally, restored with gold or acrylic. Found sign differences between subgingivally placements and other categories

Tarnov et al# 1986 showed in a short term clinical study a very rapid recede of the gingival unit following crown placement

Eksperimentelle

Silness 1970 The lack of correlation may be the result of poor plaque detection in irregularities and pores around the crown margins

Bergman, Hugoson 1971: Assessed 30 patients with Partial and crowns

Renggli, 1972: Fitted supragingival gold inlays with ODR in 12 Man pm, Recorded the gingival fluid prior to, * 14d, & 60 d after placement and compared to contralaterals. Plaque amount increased sign. Renggli, 1974: No difference noted between supragingivally located restorations and sound surfaces. *

Richter & Ueno 1973 showed that the gingival conditions may be unaffected by crowns, even when they are located subgingivally

Kröncke placed rough and smooth gold flakes beneath gingiva.

Newcomb 1974 reported in a study where the crown margin location was assessed relative to the base of the crevice * It is possible that larger differences could have been registered between the supragingival and the deepest subgingival crown margins.

Kerschbaum & Meier 1978 showed that the gingival conditions may be unaffected by crowns, even when they are located subgingivally

Lang, Kiel 1983: Study effect on microflora and periodontal tissue by intentionally placing ODR. More inflammation was observed adjacent to ODR than on controls. After placement the flora changed to a flora characteristic of chronic periodontitis., e.g black pigmented bacteriodes. Patient response varied at different rates. It is not established if the quantity or the quality of the plaque is the most important The quality of the plaque after the placements of crowns may be more important than the quantity

Müller 1986 The quality of the plaque after the placements of crowns may be more important than the quantity

Flores-de-Jacoby 1989 The quality of the plaque after the placements of crowns may be more important than the quantity

The present results, with a lack of differences in PI accompanied by the higher GI and increased attachment and bone loss around the abutments, may support the theory of a shifting to a more aggressive microflora.

Observasjonelle

Rohner et al# 1983 in a cross-sectional study reported a significantly higher annual bone loss for teeth bearing crowns compared to sound teeth

Caries

* One clinical study report a lower incidence of caries along subgingivally placed crown margins (Hammer 1978). * To the authors' knowledge there are no reports in the literature on the incidence of secondary caries relative to the location of the crown margins, which have also taken into consideration the change of the location of the gingival crest.