ZPGS Jahrestagung
13. und 14. Oktober 2000, Luzern

Congress SSPD
october 13 and 14 2000, Lucern

Cost-Benefit-Analysis in Prosthodontics

Friday	**october 13, 2000**	
09:00-09:05	Opening of the congress	Budtz-Jørgensen, Geneva
09:00-09:15	Introduction to the program	Koller, Zurich
	Opening keynote lectures	
09:15-10:00	Principles on outcome measures in health care,	Güntert, Bielefeld
10:00-10:45	Prosthodontics: essential or elective treatment for good quality of life?	Mc Entee, Vancouver
10:45-11:15	Break	
	Prosthetic infra- and suprastructure I	
11:15-11:45	Prosthodontics and oral biology	Mombelli, Geneva
11:45-12:15	Failures in endodontics and cores: are implants a better alternative?	Chucchi, Geneva
12:15-13:45	Lunch	
13:45:17:15	**Short presentations, Table Clinics and poster session** (Price for best poster and price for best short presentation/table clinic)	
17:30	**General Assembly SSPD**	
Saturday	**october 14, 2000**	
	Prosthetic infra- and suprastructure II	
09:00-09:30	Periodontally compromised teeth vs. implants	Hämmerli, Bern
09:30-10:00	Single anterior tooth loss: conventional vs. implant supported restorations	Grunder, Zurich
10:00-10:30	Computer-assisted vs. conventional restorations	Lehner, Zurich
10:30-11:00	Fixed vs. removable prosthodontics	Jokstad, Oslo
11:00-11:30	Break	
	Closing keynote lectures	
11:30-12:15	The non-prosthodontic solution	Henry, Perth
12:15-13:00	Target populations and target topics in future research	Beck, Chappel Hill
13:00-13:05	Closing remarks	Budtz-Jørgensen, Geneva

Fixed versus removable prosthodontics: higher costs, but higher benefit?

Asbjørn Jokstad
Institute of Clinical Dentistry
University of Oslo

Three questions

1. How has **clinical evidence** of the two treatment methods been demonstrated?
2. Have **economic aspects** been included in clinical studies?
3. Have these economic aspects been included in **comparative studies** with the two treatment methods?

Luthardt et al. Dtsch Zahnärstl Z 2000;55:592-609

What is health economics and cost-benefit analysis?

Methodological issues in cost-benefit considerations

1. From whose perspective should therapy effectiveness be assessed?

Whose perspective?

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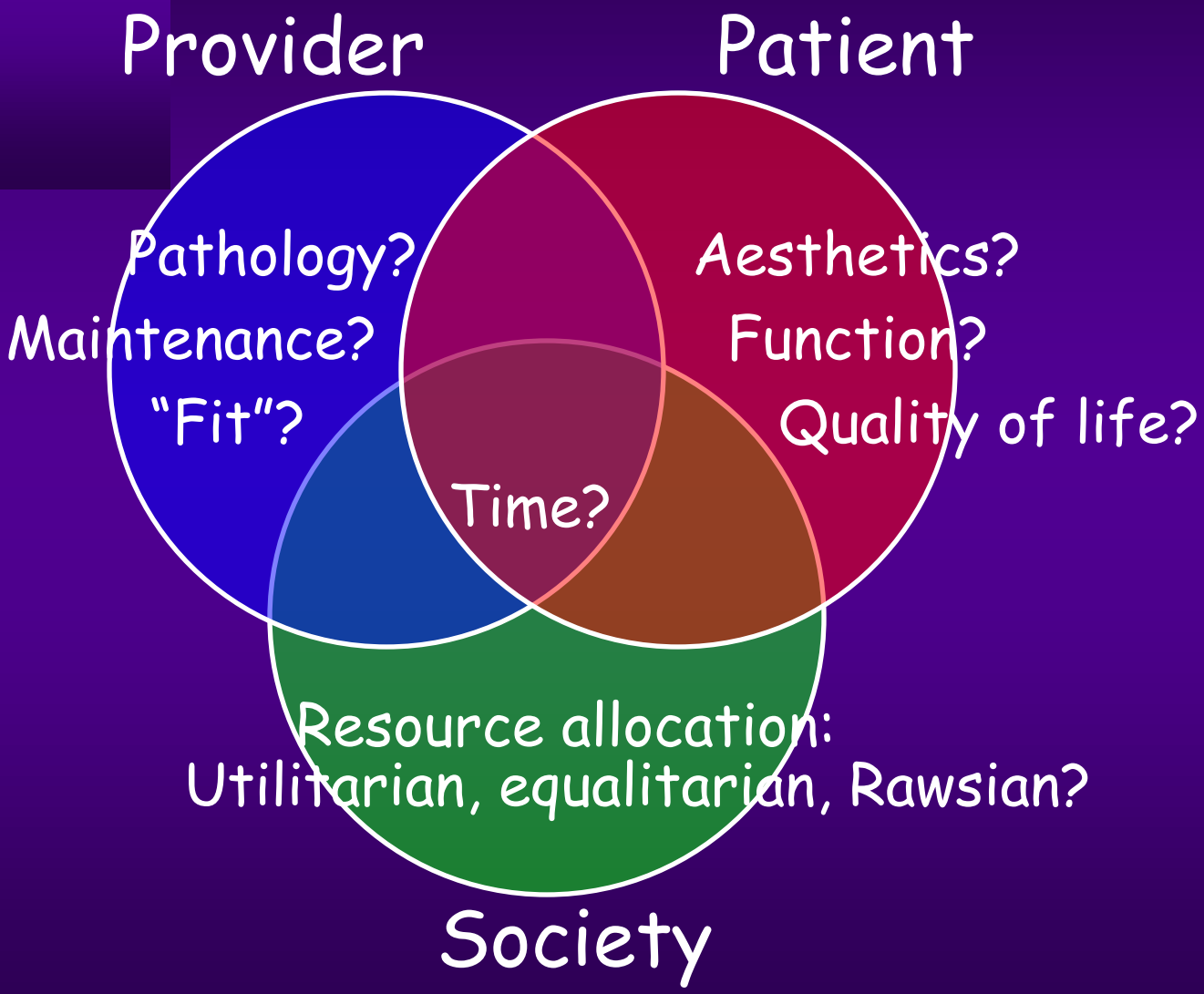

Methodological issues in cost-benefit considerations

1. From whose perspective should therapy effectiveness be assessed?
2. Which indicators should be used to describe health and treatment outcomes, and how can values be assigned to the different indicators?

1. From whose perspective should therapy effectiveness be assessed?
2. **Which indicators should be used to describe health and treatment outcomes, and how can values be assigned to the different indicators?**

Which indicators?

- Aesthetics?
- Functional measures?
- Patient satisfaction?
- Time?
- Adverse effects on remaining oral tissues?
- Longevity?
- Quality of life?

Methodological issues in cost-benefit considerations

1. From whose perspective should therapy effectiveness be assessed?
2. Which indicators should be used to describe health and treatment outcomes, and how can values be assigned to the different indicators?
3. What is the quality of the data available for appraisal?

Methodological issues in cost-benefit considerations

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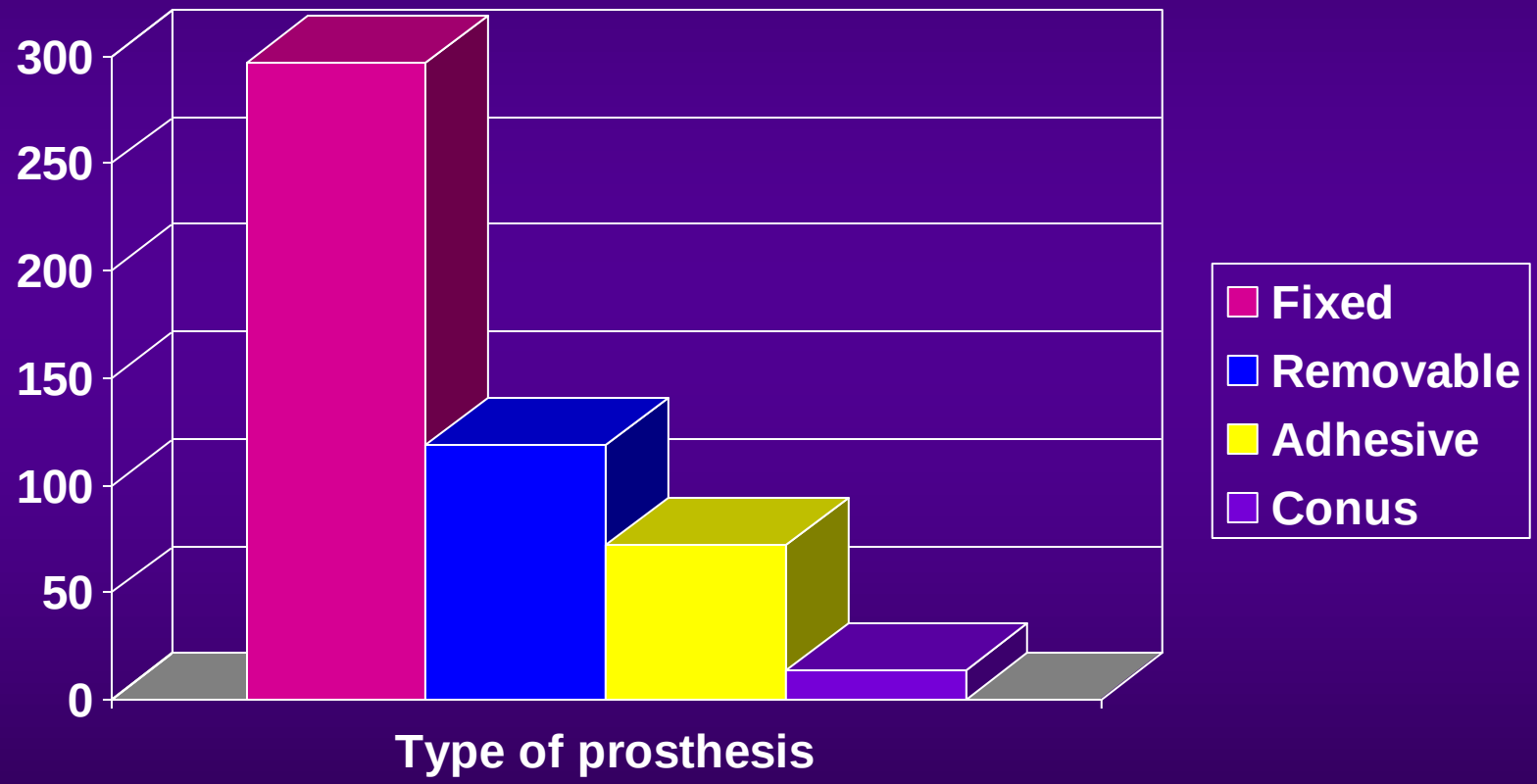
Appraisal of effectiveness: appropriate study designs

(From CEBM: http://cebm.jr2.ox.ac.uk/docs/levels.html)

1	**Systematic review (RCTs)** **Individual RCTs (narrow confidence interval)**
2	Systematic review of cohort studies Individual cohort study (and low quality RCTs)
3	Systematic review of case-control studies Individual case-control study
4	Case-series and poor quality cohort and case-control studies
5	Expert opinion without explicit critical appraisal, or based on physiology, bench research or "first principles"

Clinical studies, partial tooth loss, (n=490)



Study design terminology = tower of Bable?

analytical study
case control study (89)
case serie
case study, case report
cause-effect study
clinical trial (79)
cohort study (89)
cohort study with historical controls
controlled clinical trial (95)
cross-sectional study (89)
descriptive study
diagnostic meta-analysis
diagnostic study
double blind randomized therapeutical trial with cross-over design
ecological study
etiological study
experimental study
explorative study
feasability study (79)
follow-up study (67)
historical cohort study
incidence study
intervention study
longitudinal study (79)
N=1 trial
non-randomized trial with contemporary controls
non-randomized trial with historical controls
observational study
prevalence study
prospective cohort study
prospective follow-up study, observational or experimental
prospective study (67)
quasi-experimental study
randomized clinical trial, RTC
randomized controlled trial, RCT(89)
retrospective cohort study
retrospective follow-up study
retrospective study (67)
surveillance study
survey, descriptive survey
therapeutic meta-analysis
trohoc study

Study designs- contemporary terms

- (Case study/series)
- Case-Control Study
- Cohort Study
- Cross-Sectional Survey
- Randomised Controlled Trial

Clinical studies, Int J Prosthodont 1989-1999, design characteristics

	Number of cohorts			Observation period		Size	
	1	2	>2	span	average	span	average
Prospective (n=44)	39	2	3	48 days - 23 years	4.7 years	4 -300	56
Retrospective (n=17)	13	1	3	2 - 20 years	7.2 years	24 - 273	95
Case series (n=15)	15	-	-	3 mths - 13 years	4.4 years	8- 344	88
RCT (n=10)	-	7	3	14 days - 4 years	< 1 year	14-85	43

	Size	
	span	average
Cross-sectional (n=25)	13- 879	202
Experimental (n=34)	1 -79	22
Case-controll (n=10)	8- 250	95

Why so few RCTs - and thereby basis for economic analysis?

- Ethical issues - RCT vs uncertainty
  - dentist preference
  - patient preference
- Similar arms in RCT studies?
  - patient satisfaction
- Complex - and never identical - treatment considerations:

Costs considerations in prosthetic therapy

- Fees
- Survival
- Yearly expenditures
- "Worst-case"- scenario

Costs =

Biological - Economical - Psychosocial

Choice of therapy ?

Patient information:
- pain region 44-45
- would like a better chewing situation in 4. quadrant

Findings:
35: mesially tipped
36: caries distally, bifurcation involvement, interference 25/36
47: root remains

Upper jaw front: aestetics


Findings:
42, 41, 31, 32: attachment loss, mobile
44: periapical lesion
45: caries distally, fractured reamer
47: ankylosis

Choice of therapy - possibilities

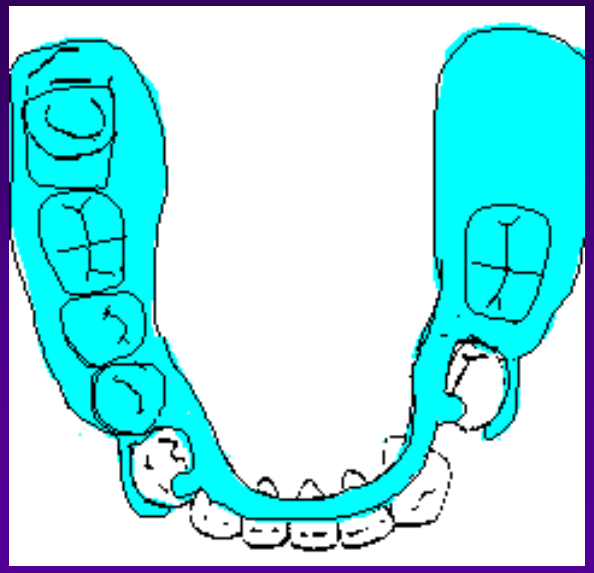
Possible technical solutions

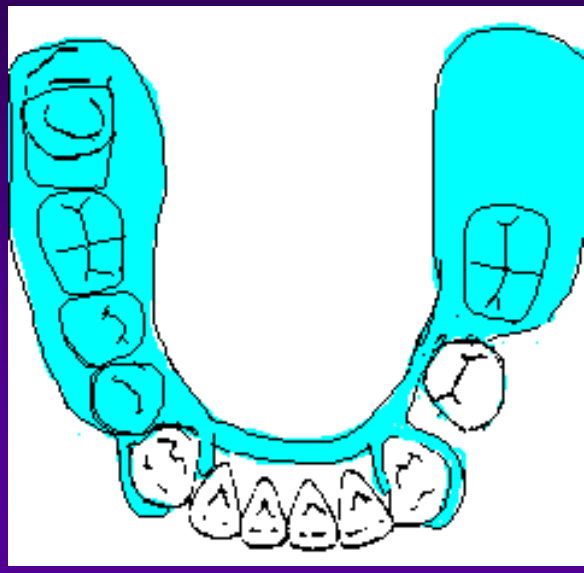
Material properties

Dentist / technician-
knowledge & capabilities

Iatrogenic
damage?
= biologic cost

Acrylic partial denture





Fee: NOK 4.000-6.000

<u>Considerations:</u>

Dental vs lingual bar?

Extraction front teeth?

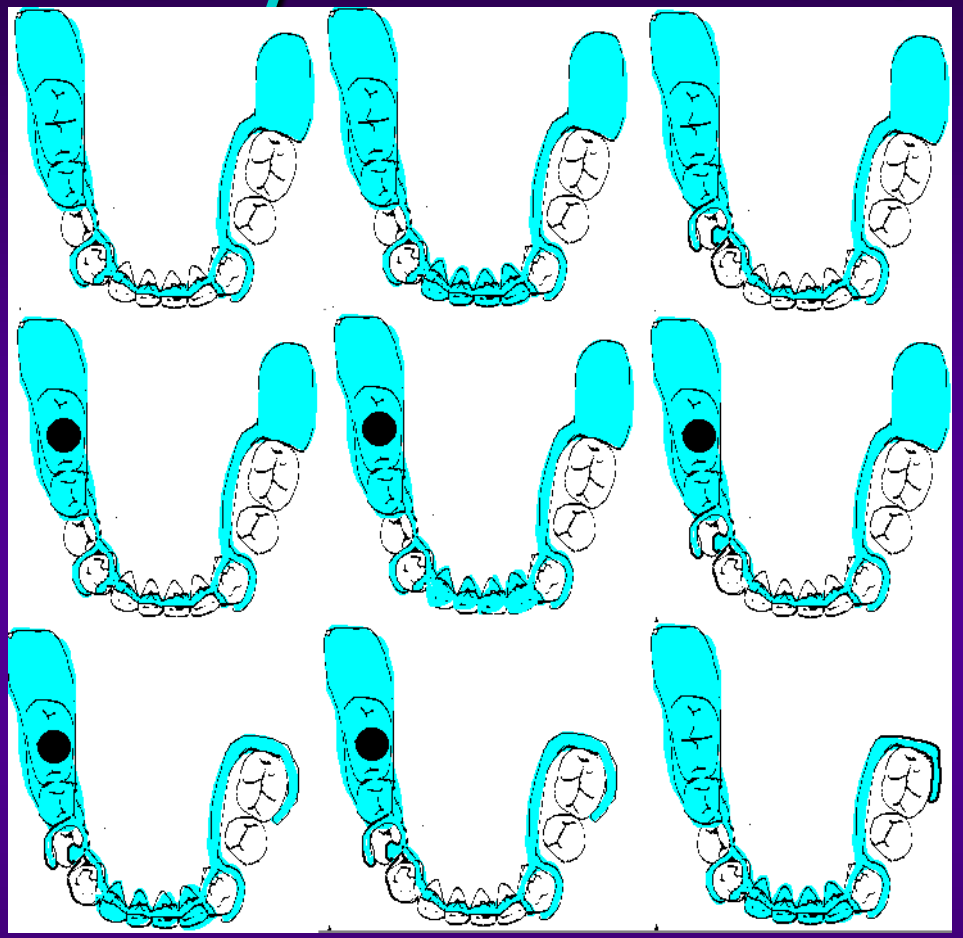
Extraction 36 mesial root?

Clasps 33 or 35?

Extraction 44 and/or 45?

Extraction 47?

Cast partial denture



Fee: NOK 7.000 - 17.000

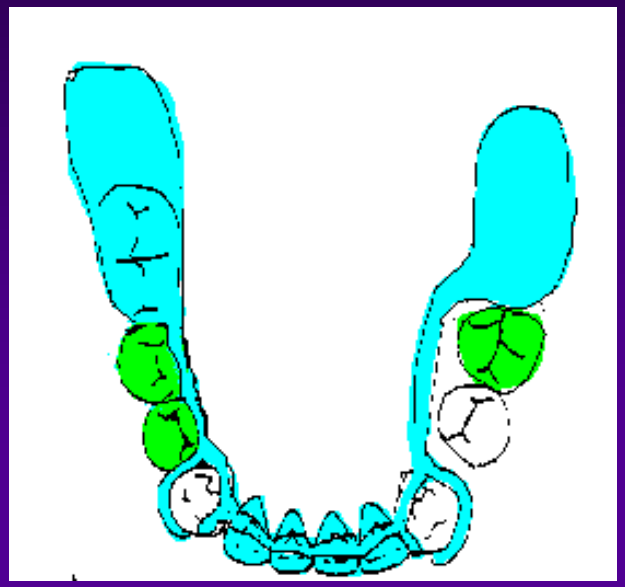
Additional Considerations

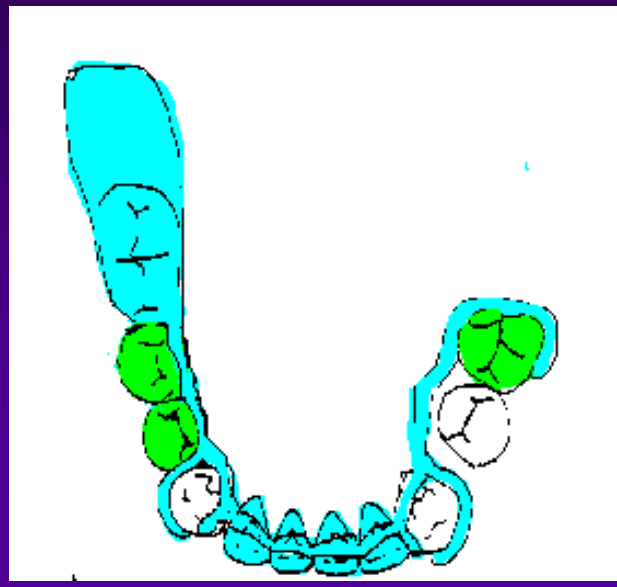
saddle 3. quadrant?

clasp 43or 44 or 45?

47: attachment or gold coping or extraction?

Cast denture + crowns





Fee: NOK 16.000-26.000

Additional considerations

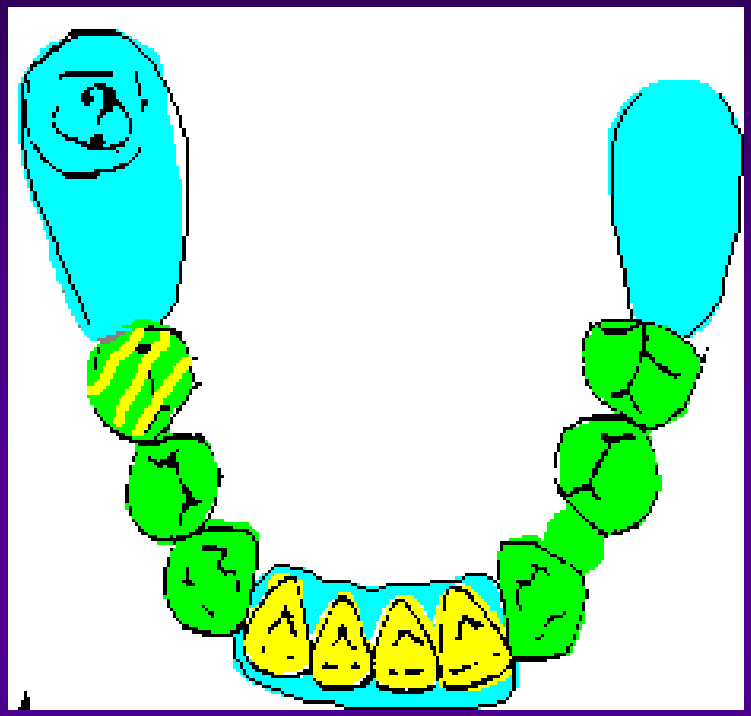
soldered 44 and 45?

36 extraction or crown?

Milled crowns?

Intra- or extracoronal attachments?

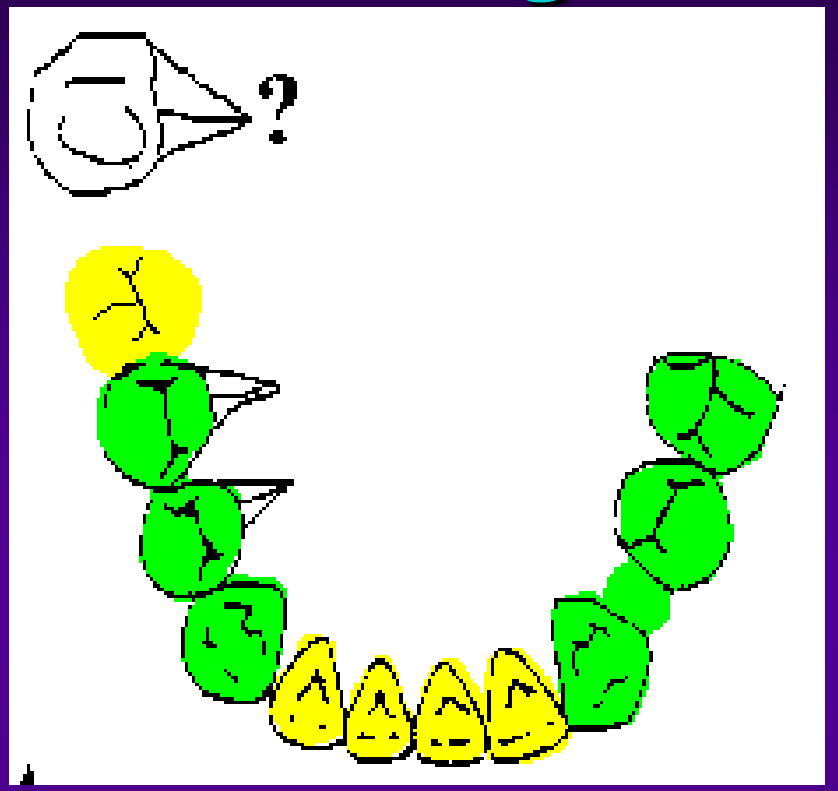
Conus bridge



Fee: NOK 30.000-35.000

<u>Considerations:</u>
47, 36, 45: extraction or gold coping or attachment?
43/44/45: separation?

Fixed bridge



Fee: NOK 30.000-35.000

<u>Considerations</u>

Conventional alloy or titan-ceramic or gold acrylic?

Znphosphat or GIC or resin cement?

Bridge extention 46? 46+47 ?

Choice of therapy - preferences

Patients differ regarding views and choice of values - i.e. "personality profile"

Håkestam, Söderfeldt: 3 groups: health - appearance - longevity

Lutz: 5 groups: Orally: functional - presentable - healthy - beautiful - metal-free

Reflected by statements on e.g.

- Total rehabilitation or minimal solution?
- Demand for longevity e.g. 1year --- 30 year?
- Demand for fixed removable prosthetic solutions?
- Expectance of treatment?
- Risk attitude to iatrogenic damage, i.e. future prognosis of tooth?
- Patient economy.

Cost-benefit evaluations must be individual

Choice of therapy - aims

1. Technical solutions
2. Patient views and choice of values

   Individually aimed cost-benefit evaluations

3. **Realistic aims with different technical solutions?**
   - **Restore function?**
   - **Change appearance?**
   - **Prevent future problems?**

   = <u>psychosocial values/costs</u>

   +

   - **Level of, or risk for, iatrogenic damage?**

   = <u>biologic costs</u>

Choice of therapy -costs

1. Technical solutions
2. Patient views and choice of values

   Individally aimed treatment planning
3. Realistic aims with different technical solutions?

4. **Alternative technical solutions**

   Economic costs

   +

   Prognosis = **biological costs**

   psychosocial costs

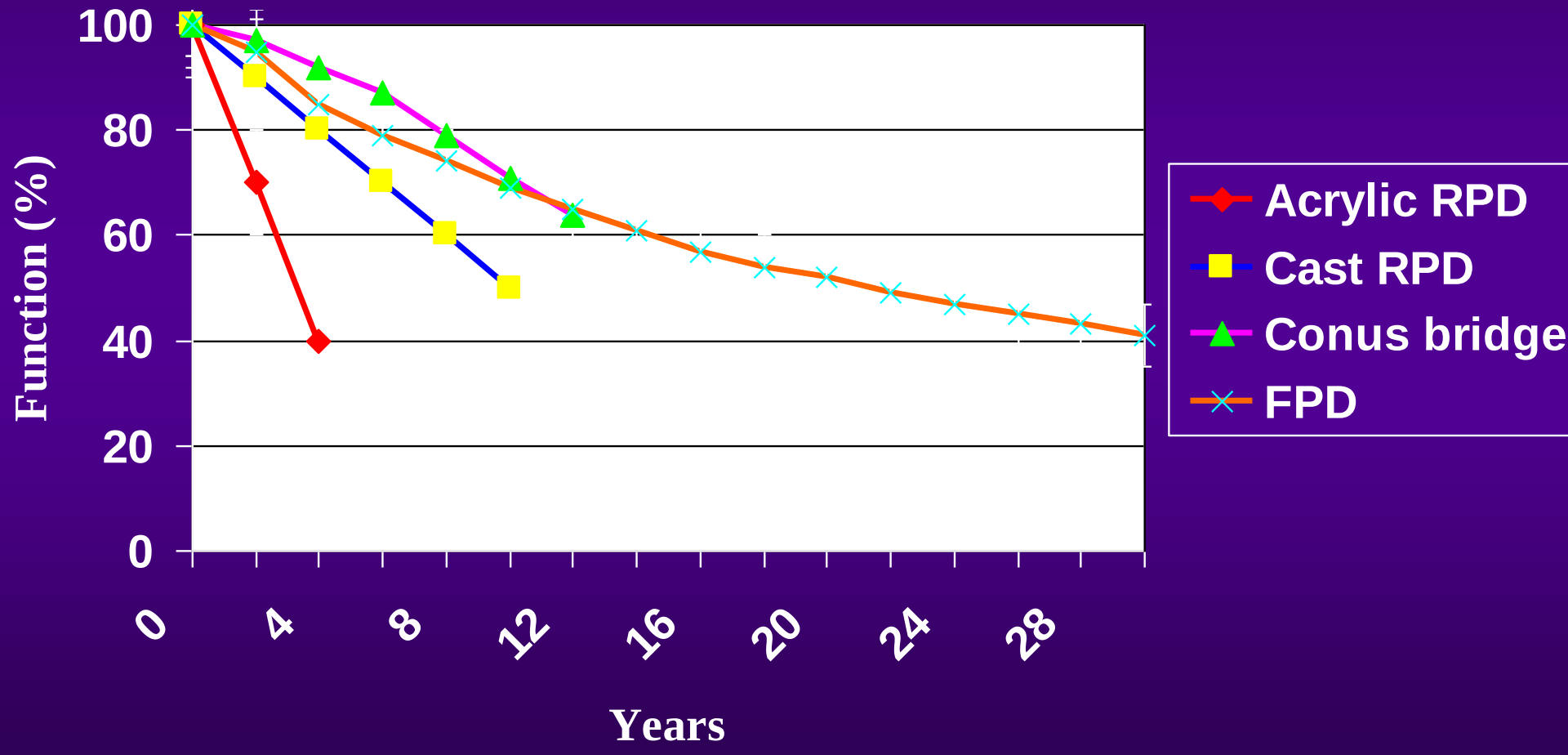
   economic costs

Economic costs over time

- Initial fee
- Prognosis
  a. Average survival
  b. Yearly maintenance in time = costs

a x b = economic costs over time

Survival, published data



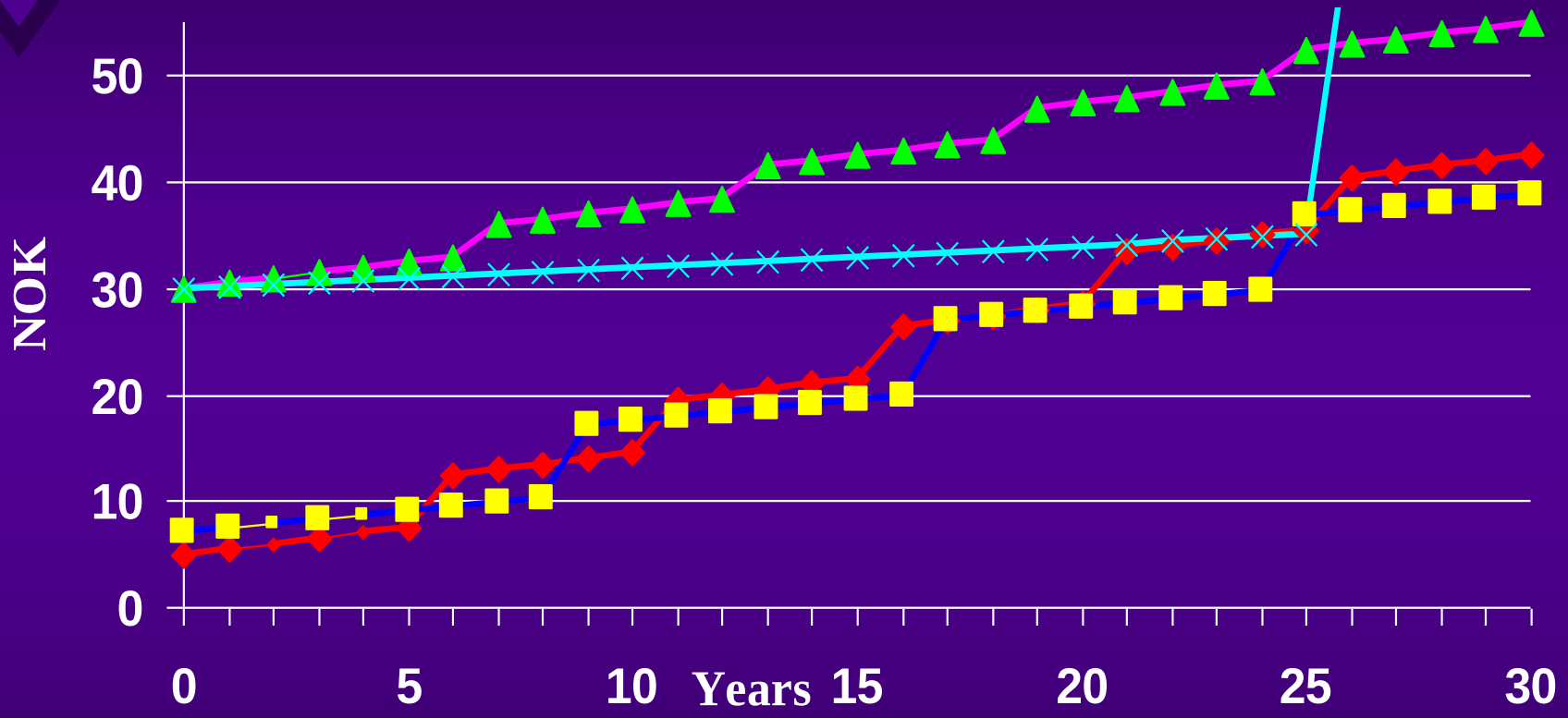
Maintenance (minutes/year)

Type:	Control	Adjustments	Repair	Sum
Acrylic RPD	10	clasp 2.year-10 occlusion 6.year-60	rebase 3.year-60 tech.prob 10%/2y	50
Cast RPD	10	clasp 2.year-10 occlusion 6.year- 60	rebase 6.year-60 tech.prob 8%/2y	40
Conus bridge	10	retention 2.year-10 occlusion 6.year- 60	rebase 6.year-60 endodontic 20%/10y tech.prob 100%/5y	50
FPD	10		endodontic 8%/10y tech.prob. 20%/5y	20

Summary, fee + maintenance

1 clasp part.dent.	NOK 4 - 6.000	50 min
2 cast part.dent.	NOK 7- 17.000	40 min
2b " " " + crowns	NOK 16- 26.000	45 min
3 conus bridge	NOK 30- 35.000	50 min
4 bridge	NOK 30- 35.000	20 min

Economic costs over time - theoretical model



Inadequacies of model:

Costs are not adjusted for inflation

Replacement not always possible

Based on average data - not on individual practitioners'

Other potential costs

1. What can happen if and when the prosthesis fail?

2 . How probable is it that the prosthesis which **I have made** will fail?

Potential costs

economic - biologic - psychosocial

"Worst case" situation

i.e. = failure of prosthesis within 1. year in spite of:

- *Correct indications and clinical procedures*
- *Esthetically acceptable and technically free of discrepancies at the time of delivery*

- **Probability**: *percentage of cases?*
- **Consequence**: usually a*lternative / new prosthesis*

Economic costs: *remake free of charge common, to keep good patient relationship*

+

biologic & psychosocial costs

Summary - "worst case"

Type:	Problem:	%	Additional cost
Acrylic RPD	maladaptation	<25	5.000 *Alt.prosthesis*
Cast RPD	maladaptation	<=8	7.500 *Alt.prosthesis*
Conus bridge	tight retention	0.5	1 hour *correction*
FPD	abutment fracture	0.5	15-30.000 *implant*

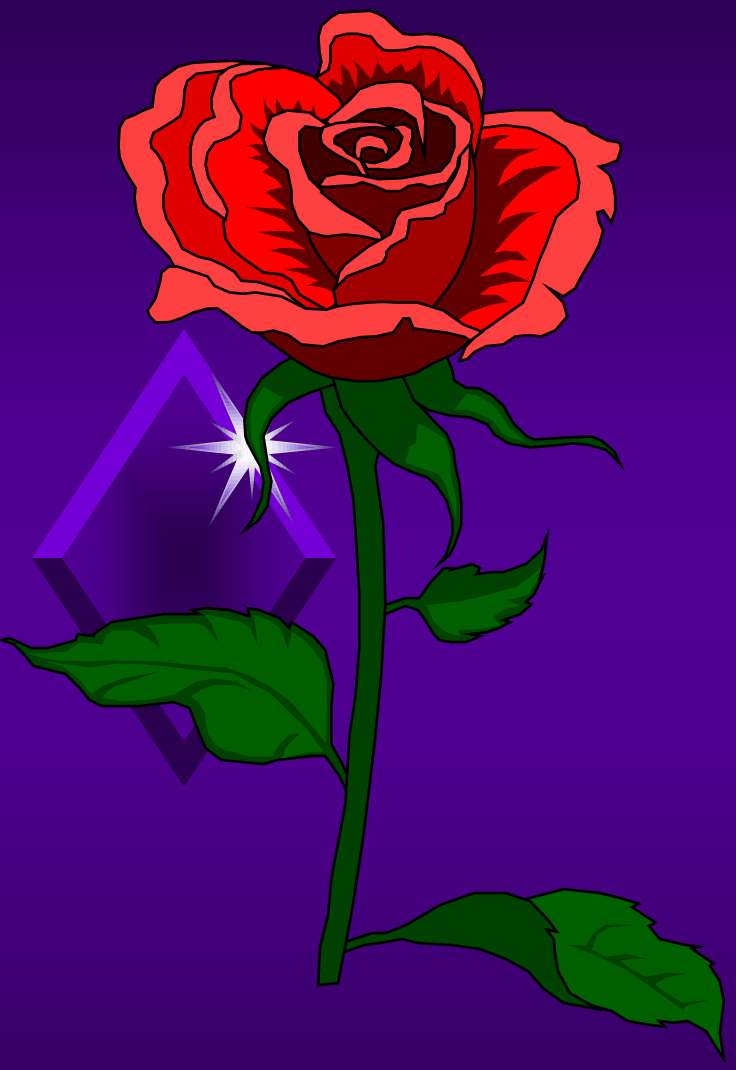
Economic analysis in prosthodontics - what is needed?

- More original efficacy clinical trials with appropriate study designs
- Trials with adequate length
- Trials using multiple criteria for measuring treatment outcomes
- Trials focussing on patient centered outcomes
- Surveys of patient values on oral health and prosthetic rehabilitation ("utility" values)

Everyday application of economic analysis in patient treatment

Costs=Biological, Economical, Psychosocial

1. Possible technical solutions
2. Patient views and choice of values
   - Individually aimed treatment planning
3. Realistic aims with different technical solutions
4. Choice of technical solution integrating:
   - Fees
   - Survival
   - Yearly expenditures
   - "Worst-case"- scenario



Thank you for your kind attention