

Prosthodontic claims in the Swedish Patient Insurance Scheme

Bengt Öwall, Rune Cronström and Nils René

Dept. of Prosthetic Dentistry, School of Dentistry, Faculty of Health Sciences,
University of Copenhagen, Copenhagen, Denmark

Öwall B, Cronström R, René N. Prosthodontic claims in the Swedish Patient Insurance Scheme. *Acta Odontol Scand* 1992;50:365–374. Oslo. ISSN 0001–6357.

The Swedish Patient Insurance Scheme includes a guarantee insurance for prosthetic treatment. Retreatments of failures, up to 2 years after cementation of fixed prosthodontics and 1 year after delivery of removable prosthodontics, are covered by the guarantee insurance scheme. Almost all private practitioners were included in this scheme at the time of the study in 1989. During a specific period all claims were studied at the time of reporting, when annexed radiographs and so forth could be analyzed. One hundred and thirty-six claims were recorded with regard to treatment injury, reasons for remake, latency times from cementation or delivery to diagnosis, and details about the teeth or constructions involved in the claim. The dentist's opinion of the cause of the failure was also recorded. The reports covered treatment injuries, most of them root perforations during preparation for a post. The guarantee claims for single crowns concerned porcelain fractures, loss of retention, and root fractures as the most frequent failures. For fixed partial dentures the failures were recorded as loss of retention, porcelain fractures, tooth or root fractures, and metal framework fractures in that order. The dentist gave information about his/her opinion of the reason for the failure in only 38.5% of the claims. There were, however, no clear findings about the reasons for the failures. □ *Causes; failures; insurance claims; prosthodontics*

Bengt Öwall, Department of Prosthetic Dentistry, School of Dentistry, Faculty of Health Sciences, University of Copenhagen, 20 Nørre Allé, DK-2200 Copenhagen N, Denmark

For all types of dental treatment it is important to study the outcome to be informed about pitfalls and prognosis. In prosthodontic treatment of the partially dentate patient aspects of both biologic and technical success or failure are of importance to be able to consider what risks should be taken during treatment planning.

Different types of studies have been presented: 1) studies of well-controlled treatments of one type by one or a few often specialized operators, 2) a specific type of treatment by a larger group of operators or general practitioners, 3) a collection of failures that show up during a certain period at a clinic, and 4) studies focusing on certain problems involved in a technique.

All these studies give information that widens the knowledge of failure. In a community aspect it is, however, most important to find out the results for general practitioners concerning types of failure, failure

rate, and how to avoid or handle the failures, to obtain information based on a relevant background.

In Sweden a Patient Insurance Scheme, which includes a Guarantee Insurance for Prosthetic Treatment and an insurance for 'treatment injuries', was introduced in 1975–1976 (1). From 1975, both private practitioners and employed dentists were involved in the treatment injury part, and from 1976 the guarantee insurance for prosthetic treatment involved almost all private practitioners enrolled in the Swedish Dental Association. Since 1987 dentists in the Public Dental Health Service have also been included.

The insurance companies, in close cooperation with the Swedish Dental Association, supported the use of the material of claims reports for research. One publication dealt with dental claims of all types and showed that treatment injuries in ortho-

dontics, oral surgery, and a miscellaneous category comprised about 5%, whereas treatment injuries and guarantee failures within prosthodontics covered the rest (2). The material in that study was drawn from the central records of the Patient Insurance and included only completed cases in which financial compensation had been awarded. Detailed data of the original treatment were thus not available. The study showed, however, that single crowns and fixed partial dentures were the dominant types of treatment that had failed, 35.2% and 52.7%, respectively, and that loss of retention, discoloration or fracture of facings (this heading in the reports includes all porcelain fractures), root fractures, and metal framework fractures of fixed prosthodontics were the commonest types of failure in that order.

The aim of the present study was to analyze and report on the failures reported to the Swedish Patient Insurance and Guarantee Insurance in order to disseminate the information as a preventive measure.

Materials and methods

The Swedish National Dental Insurance Scheme

All private practitioners (99.9%) and all dentists employed in the Public Dental Health Service are included. Patients above the age of 19 get financial support for all types of dental and prosthodontic care. The

patient costs were at the time of this study reduced to 50% or less for advanced prosthetic treatment. The National Dental Insurance includes a special paragraph on free retreatment of patients with adverse reactions to dental prosthetic materials. Such retreatments are thus not included in the Patient Insurance and Guarantee Insurance for Prosthetic Treatment.

The Patient Insurance and Guarantee Insurance for Prosthetic Treatment

Treatment injuries of any kind related to treatment by a dentist are covered up to a maximum of 10 years after the treatment. For details, see the article by Cronström et al. (1).

The Guarantee Insurance for Prosthetic Treatment covers all costs for retreatment of fixed and removable prosthodontics. For fixed prosthodontics the failure has to be diagnosed within 2 years after cementation, and for removable prosthodontics within 1 year after delivery to the patient. All types of permanent prosthetic treatment, excluding porcelain laminates and acid-etched fixed partial dentures, are covered by this guarantee. A claim can be made by the dentist who made the original treatment or by any dentist the patient wants to consult.

The claim is judged by the insurance staff, and dentists employed by the insurance company are consulted in complicated cases.

The central records of the insurance company keep all claim reports. The documents that are filed are usually rather limited with regard to details of the treatment. Roentgenograms, clinical photos, and other material of importance for the judgement are sent back to the dentist after the claim has been evaluated.

In this study, to be able to judge as much background material as possible, the patients were selected in connection with the claim and not from the files. This enabled us to see radiographs and so forth that were annexed to the claim, and to put questions to the dentist who diagnosed the failure and planned the retreatment at the time when he/she was actually involved in the treatment.

The report forms always contain infor-

Table 1. Claims rejected by the insurance and not included in the study

Reasons for rejection	No.
Prescribed (reported too late)	11
Dental laboratory involved was not insured	2
No injury or guarantee situation	2
No permanent cementation	1
Tooth injury during intubation by an M.D.	1
Patient reported. Dentist did not supply adequate material	1
Complications covered by the Nat. Dental Ins. Scheme	7
Total	25

mation about the name of the dentist who made the original treatment and the dentist who was consulted to do the retreatment. The name, sex, and age of the patient were also reported, as were the type and extent of the treatment involved.

The latency time, the time from cementation or delivery to professional diagnosis of the failure, was recorded.

For different types of treatment the following additional variables were recorded:

Single crowns: Tooth, type of crown, root canal treatment, root post.

Fixed partial dentures: Location, extent, abutment teeth, pontics, root posts, remaining dentition, and removable dentures.

Material of fixed partial dentures: Porcelain or glass, metal-ceramics, gold with or without acrylic facings.

Removable dentures: Type of denture (complete, partial), cast framework, type of retention (clasps, attachments, anchors, and so forth), remaining dentition, and removable denture in the opposite jaw, if any.

The dentist's opinion, if any, of the cause of the failure was also recorded.

If the information of interest was available in the reports or in the documents annexed to the report—for example, records, radiographs, photos, or bills from the National Dental Insurance—it was taken from there. If not, the dentists were contacted by questionnaire or by telephone. In this manner all the information wanted was collected.

During a 9-day period in May–June 1989, all claims received by the insurance company were studied.

A total of 161 claims were recorded. Twenty-five were rejected for the reasons

given in Table 1. A total of 136 records were analyzed.

Results

In 33 of the 136 claims it was another dentist than the one who carried out the original treatment who reported; thus in 75.7% of the claims it was the original dentist who reported his own treatment.

Treatment injuries

Twelve reports of treatment injuries were made. They are presented in Table 2.

Guarantee claims

Removable dentures. Fourteen reports concerned removable dentures. The number and distribution of failures were as follows: complete denture fractures ($n = 2$), RPD framework fractures (3), RPD clasp fractures (2), insufficient retention of RPD (2), clumsy construction that interfered with speech (2), porosities in acrylic (1), wear of outer crown in telescopic construction (1), and loss of facing of telescopic crown (1).

Fixed parts of fixed-removable constructions. The following seven failures were reported: root anchors' soldering to root coping fractured ($n = 1$), fractures of bars (3), and loosened inner crowns in telescopic constructions (3).

Single crowns. Fifty-one single-crown failures (Table 3) involved 30 (58.8%) crowns that were made on non-vital teeth with root posts. The crowns were placed on the following types of teeth: maxillary molars ($n = 5$), mandibular molars (10), maxillary premolars (13), mandibular premolars (3), maxillary incisors or canines (17), and mandibular incisors or canines (3).

Implantology. There were three failures: fracture of a bar in overdenture construction, superstructure fracture, and abutment fracture.

Fixed partial dentures. The number of units, abutments, abutments with root posts, and cantilever pontics are presented in Table 4.

Table 2. Treatment injuries in claims to the Swedish Patient Insurance Scheme

Treatment injuries	No.
Oral mucosa injured during preparation	1
Root perforation during preparation for post (one case includes two roots)	7
Root fracture during cementation of post	2
Vital preparation fracture during try-in or cementation of bridge	2
Total	12

Table 3. Guarantee claims, single crowns: types of crowns and types of failures, number, and latency time in months (mean and range). Loss of retention includes crowns and posts and crowns that have become loose in one piece

Type of failure	Type of crowns				Latency time (months)	
	Porcelain	Metal ceramic	Gold	All	Mean	(Range)
Porcelain fracture	10	6		16	7.4	(0.25–23)
Fracture of gold post		4		4	15.8	(14–19)
Loss of retention	1	12	1	14	13.4	(1–23)
Periapical lesion*		3	1	4	13.5	(8–22)
Root fracture		8	1	9	11.2	(1–21)
Miscellaneous†		3	1	4		
Total	11	36	4	51		

* Crowns remade owing to undiagnosed need for root filling.

† Caries ($n = 2$), unacceptable occlusion (1), acrylic facing fracture (1).

The types of failures and latency times are presented in Table 5.

The mechanical failures—loss of retention, tooth/root fractures, and metal framework fractures—comprise a total of 27. The complexity of the treatment was considerable in several patients. Drawings illustrating bridge extension, root posts and teeth in the dentitions provide an overall picture (Fig. 1).

Causes of failure

Twenty-six of the 53 (49%) single-crown claims, 18 (36.7%) of the fixed partial denture claims, and 4 (44.4%) of the removable denture claims had notes of the dentist's opinion of the cause of the failure. Thus,

38.7% of 124 claims included such information, and 40 of these were given by dentists who had themselves carried out the original treatment.

Fifteen of the 'causes' were only statements about the constructions or circumstances like 'cantilever pontic', 'root post in abutment', and so forth, giving no additional information beyond what was known from the registrations.

Nineteen other causes gave some additional information to explain the failure of the specific treatment. None of these 19 causes was given more than once, and no general conclusions could be drawn. Examples are as follows: 'root resorption not diagnosed' and 'too few antagonists'.

Table 4. Guarantee claims, fixed partial dentures (FPD): extension of FPD, number of abutments, root-canal-treated abutments with posts, and cantilever pontics (mean and range)

	Extension			All FPD
	≥8	5–7	2–4	
No. of FPD	16	12	21	49
Units	10.7 (8–14)	5.6 (5–6)	3.1 (2–4)	6.2 (2–14)
Abutments	6.5 (4–10)	3.7 (3–5)	2.2 (2–3)	4.0 (2–10)
Abutments with posts	2.4 (0–5)	1.4 (0–4)	1.6 (0–3)	1.8 (0–5)
Cantilever pontics	1.9 (0–3)	0.3 (0–1)	0.2 (0–1)	0.5 (0–3)

Table 5. Guarantee claims, fixed partial dentures (FPD): types of failures, number, and latency times in months (mean and range for all FPD). Loss of retention includes retainers and retainers and posts that have become loose in one piece

Type of failure	Extension			All FPD (n = 49)
	≥8	5-7	2-4	
Porcelain fracture	3	2	3	8
Latency time	9.7	4.0	10.0	8.4 (1-17)
Loss of retention*	4	4	8	16
Latency time	16.0	10.8	14.1	13.6 (5-23)
Tooth/root fracture†	3	1	2	6
Latency time	9.3	11	7.8	8.9 (0.5-17)
Metal framework fracture‡	2	1	2	5
Latency time	14.5	5	6.7	10.4 (3-22)
Other§	4	4	6	14
Total	16	12	21	49

* Four cases included two adjacent retainers that had lost retention.

† One of the fractured abutments was a vital preparation fracture.

‡ In three cases of fracture of bridgework there was also root fracture.

§ Other types of failures with low frequencies (≤3): caries, 3; periapical lesion, 3; marginal defect, 1; unacceptable occlusion, 1; acrylic facing fracture, 2; clumsy bridge design, 2; food retention, 1; decubitus of tongue, 1.

|| One associated with loss of retention, three with metal framework fracture.

Laboratory mistakes were reported in four cases of porcelain failure, poor clinical quality of previous work was mentioned six times, and in four claims, in which crowns with posts that had become loose were reported, the cause was said to be too short posts.

A minor difference could be noticed between reports by new dentists and by those dentists who reported themselves. 'Poor quality' was only found in reports made by a new dentist.

Discussion

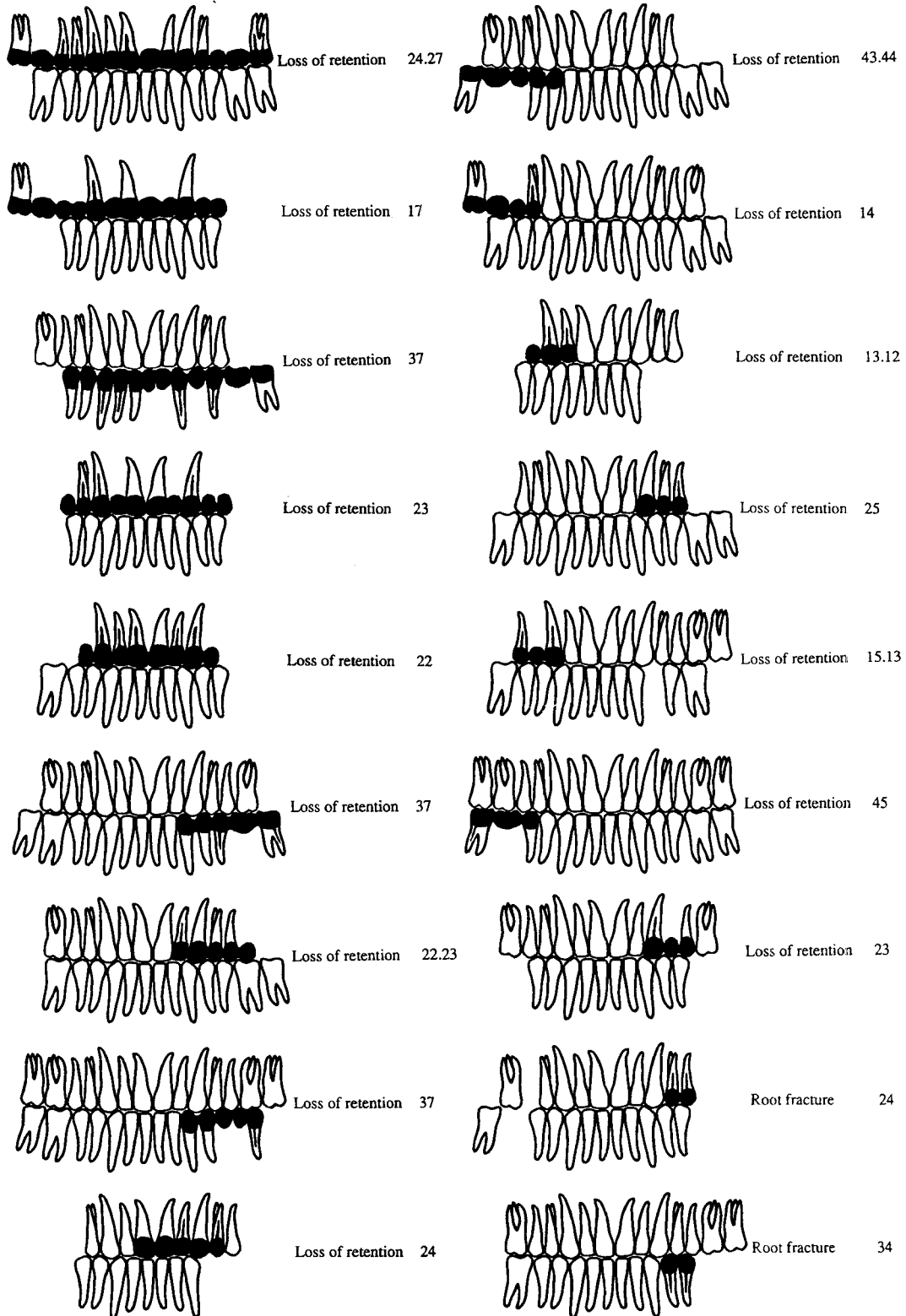
This study analyzes claims to the Patient Insurance and Guarantee Insurance for prosthetic treatment in greater depth than the study presented earlier (2).

The types of treatment involved and the types of failure reported in the 1986 study (2) and in this one show some differences. Thirty-five per cent of the claims from 1986 concerned single crowns, compared with 42% in this study. For fixed partial dentures the corresponding figures were 53% and

39%. The treatment injuries related to prosthetic treatment were included in the calculations for the 1986 study. In this study we distinguished between treatment injuries and guarantee failures, as this distinction is important in evaluating whether the failure is covered by the insurance (1).

The relative frequency of the claims for single crowns has increased. This is probably explained by the facts that in 1986 only private practitioners were included in the Guarantee Insurance Scheme and that dentists in the Public Dental Health Service are now included. The latter produce fewer fixed partial dentures than private practitioners and relatively more single crowns (3).

In the 1986 study the relative frequencies of failures in fixed prosthodontics (single crowns + fixed partial dentures) were as follows: loss of retention, 30.5%; root fracture, 14.1%; discoloration/fractures of facings, crowns, and pontics, 12.2%; and metal framework fracture in fixed partial dentures, 9.3%. In this study the comparable figures were 17.5%, 12.7%, 19.1%, and 6.4%, respectively. There is thus a difference in relative frequency of failures which is



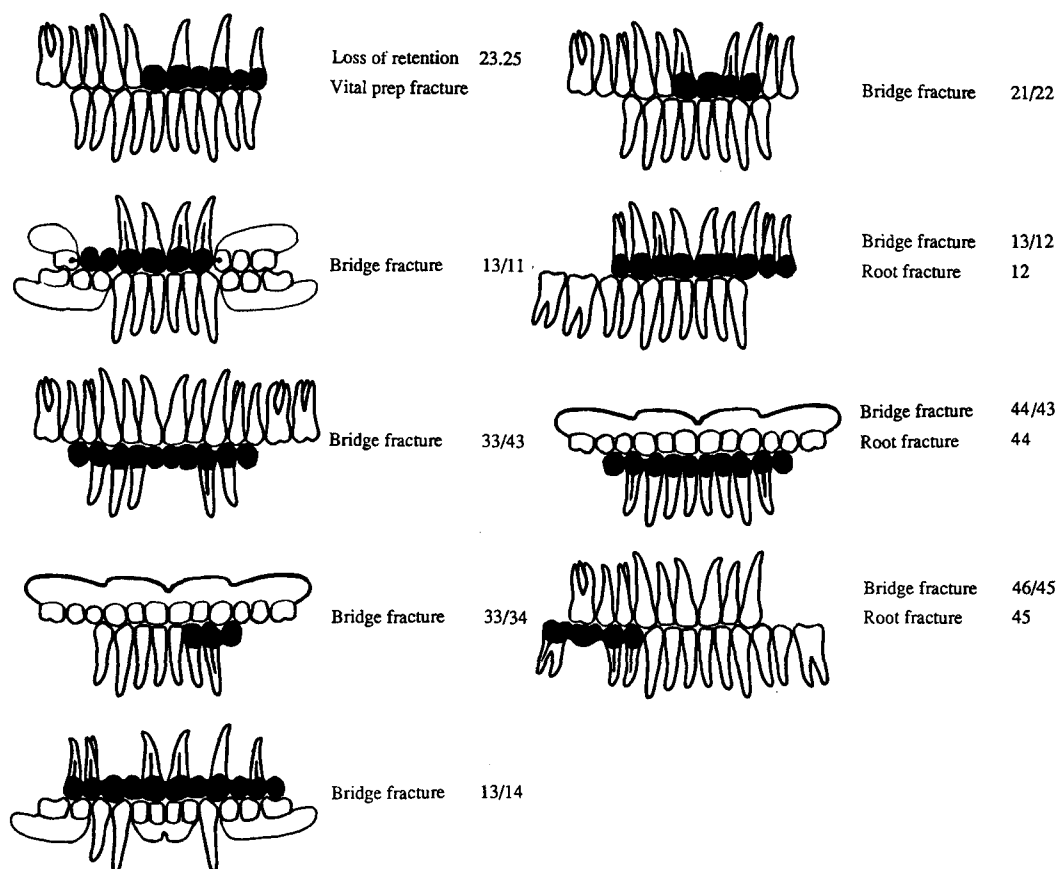


Fig. 1. Design of 27 fixed partial dentures with the following technical failures: loss of retention, tooth/root fractures, and metal framework fractures. The dentitions are presented schematically, and the dimensions and occlusions are not accurate.

especially obvious with regard to loss of retention, which has decreased from 30.5% to 17.5%. As loss of retention is the most frequent cause of failure in fixed partial dentures and the second most frequent cause of failure of single crowns in this study, the effect of added claims from the Public Dental Health Service does not explain this difference. One possible explanation is that failures and causes of failures have been reported to Swedish dentists in recent years and have probably made them more aware of difficulties and risks with crown and bridge prostheses (2, 7, 8).

In the 1986 study it was not possible to differentiate between types of defects of facings and pontics, as they were pooled

under the heading 'discolorations and fractures' in the claims. They comprised 12.2% of all failures. In the 1989 study it was possible to differentiate. Porcelain fractures alone comprised 45.3% of all failures, and discoloration or fracture of acrylic facings was found in one report only.

There is no explanation of this finding. A change in the overall production from gold with acrylic facings towards more metal ceramics between 1986 and 1989 is very unlikely. The reason is probably a tendency for dentists to report more of the 'minor' failures over the years as they become increasingly familiar with the Guarantee Insurance Scheme.

The 1986 study reported on claims from

October–December and the 1989 study from May–June. These periods are at the end of the productive autumn and spring periods, respectively, so there is no reason to believe that any seasonal variation is the reason for the difference.

It is obvious from these figures that failure rates of materials collected from practitioners may change rapidly for several reasons, such as the production, the categories of dentists included, the reporting system, and the evaluation system. There is thus good reason to discuss the possibility of comparing different studies.

Several studies of failures and failure rates in prosthodontics have been published. The collection of the materials, the definition of the types of failure, the risk-taking involved in the original treatment, the problem of deciding the acceptable or unacceptable life span of a treatment, and so forth have varied considerably.

Roberts (4) reported on a review of all fixed partial dentures produced during a certain time period at one clinic. The study focused on the retainers, and he defined failure as a defect that necessitated the remaking of the fixed partial denture. The failure rate for different types of retainers varied over the 12-year period under review from 0.5% to 8% and the time of service from 3.9 to 6.3 years.

Schwartz *et al.* (5) reported on all crowns and fixed partial dentures that were diagnosed as failures at a university clinic over a 3-year period. The criteria for inclusion in the study were that the restoration required repair or replacement and that the patient could state with reasonable certainty the date of placement. Failures due to oral disease amounted to 50.9% (caries, 36.8%), with a lifespan for the restorations of 5.3 years when the failure was periapical involvement and 11.1 years when it was caries. The mechanical problems listed were uncemented crowns, defective margins, wear of gold or acrylic resin, lost veneers, poor esthetics, broken solder joints, and broken pontics. Together these failures composed 43.6%, with a lifespan varying from 6.5 to 13.1 years.

Walton *et al.* (6) collected all failures in patients who showed up at a clinic after

referral and in patients who presented directly. Only restorations that required replacement were included. Moreover, Walton *et al.* divided their material into oral disease failures and mechanical problems. The relative frequencies and mean length of service were, for oral disease, 32.0% and 9.7 years, and for mechanical problems, 66.7% and 7.7 years.

Random *et al.* (7) studied a material of extensive fixed partial dentures produced by general practitioners, after 6–7 years. The reconstructions failed technically (18.6% in relative frequency), were esthetically unacceptable (12%), or showed caries (25.5%) or endodontic (11.7%) or periodontal (9.9%) complications. They found that cantilevering was directly related to a high failure rate.

Karlsson (8) studied fixed partial dentures produced by private practitioners, after 14 years. The rate of removed restorations was 17%, and the overall failure rate 26%. The failures increased drastically after 7 years of service, and the rate was higher for restorations with cantilever pontics.

Karlsson (8) points out the problems of differentiating between reasons for failure. A minor carious lesion does not result in a replacement; on the other hand, an uncemented retainer is often combined with severe caries of the abutment. The risk of recording errors is obvious. Thus, in a study of reasons for failure the observer instruction and calibration is important. Karlsson (8) was independent, had not been involved in the treatment, and examined all the restorations himself. In the study by Random *et al.* (7), however, the same dental surgeons who themselves had performed the original treatment made the diagnosis of failure. A risk for bias exists—for example, recording an uncemented retainer as caries—as in fixed partial dentures it can be a delicate technical problem to diagnose an uncemented retainer and, on top of that, a psychologic problem to inform the patient of such a serious failure.

These examples illustrate some of the problems of studies or failures.

This study can be said to be fairly representative of Swedish prosthodontic care as a whole. As already discussed by René *et al.* (2), there is some risk of underreporting but

Table 6. Ranking of failures: loss of retention, tooth/root fracture, and metal framework fracture in the listed publications*

Publication	Loss of retention	Tooth/root fracture	Metal framework fracture
Landholt & Lang, 1988 (10)	1	2	3
Strub et al., 1989 (11)	3	2	1
Schwartz et al., 1970 (5)	1	2	—
Nyman & Lindhe, 1979 (12)	1	2	3
Izikowitz, 1985 (13)	—	—	1
Randow et al., 1986 (7)	1	2	3
Walton et al., 1986 (6)	1	2	3
Karlsson, 1989 (8)	1	3	2
René et al., 1991 (2)	1	2	3
Cheung et al., 1990 (14)	1	2	—
Valderhaug, 1991 (9)	1	2	3

* 1 signifies most frequent and 3 most infrequent; — means not reported.

very little risk of overreporting. It is not possible to go into detail about the total frequencies of different failures, as comparisons with total production can be made only in a very broad sense. The risk that practitioners neglect any specific types of failure may also exist; for example, defective crown margins are probably fairly often overlooked, especially as so many of the claims are made by the same dentist who carried out the original treatment. This means that many patients during the first years after prosthetic treatment are under the care of the same dentist who effected the treatment. That the dentist himself/herself might report 'low-quality' aspects of his/her work is not to be expected. Poor clinical quality was mentioned as a cause of remake in six cases, all of which were reported by a new dentist. Long-term and medium-term negative effects of a restoration, which cannot be obvious to the patient during the first years, are thus also at risk of underrepresentation in this material. It is emphasized that failure in this study is the reason for remake diagnosed by a dentist during the first 1 and 2 years for removable and fixed prosthodontics, respectively. From the viewpoint of evaluating the treatment success of general practitioners, these figures, however, constitute the reality in their profession.

From the viewpoint of the practicing dentist it is probably very important to be informed of the types of treatment injury

and failure that may occur. It is obviously true that the 'knowledge of the circumstances that cause fixed partial dentures and crowns to become unserviceable should help dentists treat patients who need these restorations, and make more reliable prognoses for them' (5), and that treatments that fail within the first years of service are in this respect more important than those that fail after a longer period of time. Frequencies, total or relative, add further information on the importance of the problem. Details on frequencies may be of less importance, especially considering the problems involved in the collection and evaluation of data.

A ranking of the failures will give a possibility to compare studies, irrespective of details in material, type of definitions, and so forth. The most drastic failures are the mechanical problems of fixed restorations—loss of retention, tooth/root fractures, and metal framework fractures. In Table 6 the ranking of these three failures in some published studies is given. From that overview it seems reasonable to assume that the mechanical problems of fixed prosthodontics are loss of retention, tooth/root fractures, and metal framework fractures, in that order. This seems to be relatively independent of the type of material and the length of the observation period and is in agreement with the findings in this study.

In other studies the terms 'time of service' (9), 'average time in the mouth' (4), 'mean

life span' (5), and 'mean length of service' (6) have been used. These reports all cover much longer periods than is the case in this study and may lie outside what can be considered failure and approach what may be described as a reasonable life span.

Porcelain fractures are also of the 'accident type' of failure. The importance of a porcelain fracture is, as also mentioned by Karlsson (8), not necessarily a reason for remake. Possibilities for repair can be considered. Porcelain fractures are, however, judged from the results presented, a problem that must be taken into account. The results of this study do not give any information as to whether a repair has been attempted, nor do they show differences in the indications for retreatment which probably exist between practitioners.

The latency times for the types of failures to show up were not significantly different. There seems to be a tendency for the latency time of porcelain fractures to be shorter than that of other complications, which is understandable as this type of failure may be directly related to a laboratory mistake and is immediately obvious to the patient.

The present study has shown that several of the types of complications described in other studies with longer posttreatment observation periods are to be found already within 2 years. This underlines the need for dentists to focus on failures.

References

1. Cronström R, René N, Öwall B, Blomqvist A. The Swedish patient insurance scheme and guarantee insurance for prosthodontic treatment. *Int Dent J* 1992;42:113-7.
2. René N, Öwall B, Cronström R. Dental claims in the Swedish Patient Insurance Scheme. *Int Dent J* 1991;41:157-63.
3. Sundberg H, Öwall B. Försäkringstandvården under åren 1974-1981. Tandvårdens inriktning inom folktandvård och privattandvård i tre försäkringskassseområden under åren 1976, 1978 och 1981. *Swed Dent J* 1984;76:837-48.
4. Roberts DH. The failure of retainers in bridge prostheses. *Br Dent J* 1970;128:117-24.
5. Schwartz NL, Whitsett LD, Berry TG, Stewart JL. Unserviceable crowns and fixed partial dentures: life-span and causes for loss of serviceability. *J Am Dent Assoc* 1970;81:1395-401.
6. Walton JN, Gardner FM, Agar JR. A survey of crown and fixed partial denture failures: length of service and reasons for replacement. *J Prosthet Dent* 1986;56:416-21.
7. Randow K, Glantz P-O, Zöger B. Technical failures and some related clinical complications in extensive fixed prosthodontics. An epidemiological study of long-term clinical quality. *Acta Odontol Scand* 1986;44:246-55.
8. Karlsson S. Failures and length of service in fixed prosthodontics after long-term function. *Swed Dent J* 1989;13:185-92.
9. Valderhaug J. A 15-year clinical evaluation of fixed prosthodontics. *Acta Odontol Scand* 1991;49:35-40.
10. Landolt A, Lang NP. Erfolg und Misserfolg bei Extensionsbrücken. *Schweiz Monatsschr Zahnmed* 1988;98:239-44.
11. Strub JR, Linter H, Marinello CP. Rehabilitation of partially edentulous patients using cantilever bridges: a retrospective study. *Int J Periodont Rest Dent* 1989;9:365-75.
12. Nyman S, Lindhe J. A longitudinal study of combined periodontal and prosthetic treatment of patients with advanced periodontal disease. *J Periodontol* 1979;50:163-9.
13. Izikowitz L. A long-term prognosis for the free-end saddle-bridge. *J Oral Rehabil* 1985;12:247-62.
14. Cheung GSP, Dimmer A, Mellor R, Gale M. A clinical evaluation of conventional bridgework. *J Oral Rehabil* 1990;17:131-6.