

An evaluation of 50 years of reconstructive dentistry. Part II: Effectiveness

Jerome M. Schweitzer, D.D.S.

New York, N.Y.

Interprofessional relations include the concept of communication. It is the dentist's duty to remember, record, and communicate. The objective is to teach each other and advance the effectiveness of dental service.

During 50 years of dental practice, I have observed, compared, reflected, recorded, and documented experiences which I would like to share with my colleagues. Part of the data, observations, and results have already been published.¹⁻³ This article offers an evaluation of reconstructive therapy for patients who remained under observation for at least 10 years.

DOCUMENTATION

Careful documentation is a difficult and laborious task, entailing the following factors:

1. Records should include observations on many similar experiences for long periods of time. The most valuable records are the observations reported at regular intervals of approximately every 2 years.
2. Patients must be receptive to the program; they must take dental health seriously and return for periodic examinations, diagnosis, and therapy.
3. Record keeping is most meaningful if patients remain available for years. To acquire valid information, data should be recorded throughout the entire period of practice. Dentists should objectively evaluate and record the results of procedures.

To accumulate data over a long period of time demands curiosity, enthusiasm, and industry. While all patients should be included, not all continue to live within reasonable distance of one dentist for enough years to fulfill the requirement of time; other patients die or seek dental care elsewhere.

This report includes records of all patients under

treatment. Record keeping began in the early 1920s. The data, radiographs, and photographs span a period of almost 60 years. They have proved invaluable in assessing procedures.

PROGNOSIS

Prognosis may be applied to a disease or therapy. In rehabilitation, it is an effort to foretell the destiny of the natural and prosthetic complements of the treated stomatognathic system. A sound prognosis offers a projection of the useful period of service the patient may expect. This useful tool is ultimately corrected by records.

There are many factors involved in making a realistic prognosis. The most meaningful depends upon a correct diagnosis and treatment plan. The following factors should be considered:

1. Extent and type of disease, which may be systemic, local, or emotional
2. Etiology, which includes local environmental factors, some of which may be correctable or not correctable
3. Physical health and habits of the patient, the number and distribution of remaining teeth, and the health of the periodontium
4. Retention of questionable teeth, alteration in occlusal vertical dimension, and alteration of interocclusal distance
5. Problems created by uncooperative patients, inadequate home care, or failure to return for postoperative examination and therapy.
6. Biologic problems—postural changes induced by aging and disease which may alter the position of the mandible, malocclusion, growth anomaly, and systemic disease

These factors form a basis for the conjecture that the therapy will provide adequate function for a projected period, and prognoses as reported in this

article were based on these factors. Prognoses were recorded as good, fair, or poor at the time treatment started.

MATERIAL AND METHODS

Over the past 50 years, 293 patients received reconstructive therapy. To determine which of the prognosis factors related to long-term success or failure, all histories, photographs, and radiographs were reviewed and abstracted using the following form.

Name _____ Age at start _____

M _____ F _____

Condition of mouth at start: Good ___ Fair ___ Poor ___

Past history:

Had patient received periodontal therapy before or at time of examination? Yes _____ No _____

Prognosis of reconstruction: Good ___ Fair ___ Poor ___

Describe reconstruction procedures:

Has vertical dimension been increased during procedure? Yes _____ No _____

Has a fully anatomic procedure been used in the treatment? Yes _____ No _____

Articulator:

Hanau Model H _____ Transograph _____

Modified Hanau _____ Gnathograph _____

Kinescope _____ Stephens _____ Other _____

Has conformative dentistry been used? Yes ___ No ___

Has mouth been treated by sections? Yes _____ No _____

Date treatment was started: _____

Date treatment was completed: _____

Is the patient still under periodontal treatment?

Yes _____ No _____

Other significant procedures:

Date patient was last seen: _____

Condition when last seen: Good ___ Fair ___ Poor ___

Was the entire prosthesis completed at one time? Yes _____ No _____

Were mandibular or maxillary teeth treated separately? Yes _____ No _____

Did the patient move away after treatment?

Yes _____ No _____

Has the patient died? Yes _____ No _____

Doctor-patient relationship: Good ___ Fair ___ Poor ___

Of the entire population, 170 patients were observed for 10 or more years after reconstruction was completed. They constituted the number of patients meeting the criteria required for evaluation. Some of the patients who had moved returned for examination from distant areas. Some who continued dental care elsewhere arranged to have their dentist send radiographs and other pertinent information periodically. These patients were included in

Table I. Number of years from completion of reconstruction to time of the last examination

Years	No.	%
10 to 12	42	24.6
13 to 15	36	21.2
16 to 18	21	12.4
19 to 21	24	14.1
22 to 24	19	11.2
25 to 27	11	6.5
28 to 30	6	3.5
31 to 33	4	2.4
34 to 36	5	2.9
37 +	2	1.2
Total	170	100

Table II. Type of articulator used*

Model	No. of patients
Hanau Model H	117
Stephens	80
Kinescope	28
Hagman Balancer	12
Transograph	9
Unilateral articulator	7
Modified Hanau	6
Gnathoscope	3
Hanau Arcon	3

*Note: More than one articulator was used during course of therapy for some patients.

this evaluation. The other 123 patients either failed to return, died before 10 years had elapsed following completion of reconstruction, or had started initial therapy less than 10 years ago.

Included in the population was a group of 32 patients who received conformative therapy and met the requirements for evaluation. Conformative dentistry uses existing jaw relations and consists of restoring carious teeth, replacing missing teeth, and replacing old prostheses when necessary. Treatment for 23 of these patients was continuous. The remaining nine patients received treatment in intervals over a period of several years.

The 170 patients ranged from 18 to 81 years of age at the start of treatment, with the 63 men patients slightly older than the women. (Men had a mean age of 51.2 ± 10.34 years; women patients had a mean age of 46.8 ± 11.9 years.) Table I lists the number of years from completion of treatment to the time of the last examination. Twenty-eight patients (16.5%) were seen 25 or more years after completion, one patient was seen 37 years after completion, and

Table III. Oral health when last seen

Oral health	No.	%
Good	64	37.7
Fair	57	33.5
Poor	49	28.8
Total	170	100

Table IV. Relationship of dental health at last visit to prognosis at start of reconstruction

Dental health at last visit	Prognosis					
	Good		Fair		Poor	
	No.	%	No.	%	No.	%
Good	16	76.2	37	42.5	11	17.8
Fair	4	19.0	35	40.2	18	29.0
Poor	1	4.8	15	17.2	33	53.2
Total	21	100	87	100	62	100

another patient was seen 43 years after completion. The mean elapsed time from completion or reconstruction to the last postoperative visit was 18.1 years.

The period of time required for completion of rehabilitation ranged from 1 to 36 months. The mean time from start of reconstruction to completion was 9.3 months.

Many articulators were used in various stages of treatment. For many patients, more than one articulator was used. For instance, the Stephens articulator was used for preliminary prostheses and was replaced with a more appropriate articulator for permanent restorations. The Hanau H articulator was used for 117 patients (70%). In all, nine articulators were used (Table II).

RESULTS

Table III describes the state of dental health at the time the patients were last seen. Sixty-four patients (38%) enjoyed good dental health; 57 (34%) were rated as fair, and 49 (29%) were rated as poor.

Table IV illustrates the state of dental health at the time the patients were last seen in relation to the original prognoses when treatment began. The prognoses for 21 patients were good upon completion of treatment, 87 were fair, and 62 were poor. Those with poor prognoses presented severely mutilated dentitions and/or advanced periodontitis. Invariably,

Table V. Factors associated with oral health at last visit

Factor	Total patients	Good final oral health condition	
		No.	%
All subjects	170	64	37.7
Sex			
Male	63	21	33.3
Female	107	43	40.2
Age			
Less than 50	86	39	45.3
50 or older	84	25	29.8
Years since completion			
10 to 15	77	20	26.0
16 or more	93	44	47.3
Articulator			
Hanau	117	38	32.4
All others	53	26	49.1
Completed at one time			
No	72	26	36.1
Yes	98	38	38.8
Vertical dimension increased			
No	55	22	40.0
Yes	115	42	36.5
Working and balancing bites			
No	143	55	38.5
Yes	27	9	33.3

ably, these patients could retain too few teeth to result in a better prognosis. Some had had previous reconstructive treatment.

Table IV illustrates how the final oral health related to the prognosis. At the time they were last seen, 16 (76%) of the 21 patients with a good prognosis had a good final condition. Of the 87 patients with a fair prognosis, 37 (43%) were in good condition when last seen. Of the 62 patients with a poor prognosis, 11 (18%) had a good final condition, and three of these patients had lost few teeth.

The correlation between the projected evaluation and the final evaluation was +0.45. Considering all the individual factors that relate to success, this may be considered a good result.

Twenty of the 170 patients eventually lost their remaining teeth. These patients were treated with complete dentures. They comprised 32% of those whose prognoses were poor. Five patients had their remaining teeth extracted 10 to 14 years after completion of treatment; six, 15 to 19 years; five, 20 to 24 years; two, 25 to 29 years; and for two patients, more than 30 years elapsed from



Fig. 1. Left view of dentition at start of therapy.



Fig. 2. Right view of dentition at start of therapy.

original treatment to extraction of remaining teeth.

Ten patients whose prognoses were poor were advised that complete dentures were needed at the start of treatment; however, they preferred reconstruction and assumed the responsibility for failure. Four of these patients eventually required complete dentures, and five of them lost many of their remaining teeth. However, one patient with a poor prognosis still retained all teeth which had been present at the first examination.

Eighteen patients underwent a second reconstruction necessary because of failures of materials which impaired the esthetics or because a different type of reconstruction enhanced the health of the periodontium. The second reconstruction ranged from 5 to 22 years after completion of the first therapy, with an average of 14 years. Three patients required a third reconstruction.

Table V presents the relation of success to other factors. Slightly more women than men enjoyed good health at the latest examination. Patients less than 50 years of age fared better than those who were older. Those patients for whom a Hanau articulator was used did not fare as well as those for whom another articulator was used. In using the Model H Hanau, 32% of the 117 patients had good results. With other articulators, 49% of 53 patients had a good result. The major reason for this difference was that less patients for whom the Model H Hanau was used had good prognoses. Only 10 of the 117 patients for whom the Hanau articulator was used had good prognoses compared to 11 of 53 when another articulator was used.

Patients for whom reconstruction was completed

Table VI. Final oral health in relation to year reconstruction started

Year reconstruction started	Number of patients	Good final oral health	
		No.	%
1930 to 1939	11	8	72.7
1940 to 1949	46	19	41.3
1950 to 1959	61	22	36.0
1960 to 1969	52	15	28.8

in continuous treatment required less complicated therapy and fared better than those treated in intervals. Patients for whom the interocclusal distance was increased did not consistently have a better or worse result than those in which it was not. Centric and eccentric wax records were made for 27 patients. No consistent differences in the final status of the patients were observed.

The differences in oral health at the last visit shown for the various factors in Table V were relatively little. Only those differences observed in patients completed after 16 or more years versus those completed in less than 16 years were statistically significant.

Table VI shows the number of patients treated in each decade starting with 1930 to 1939 through 1960 to 1969 and the percentage of patients who had shown good dental health when last seen. The percentage decreased with each decade: 73% in 1930 to 1939, 41% in 1940 to 1949; 36% in 1950 to 1959, and 29% in 1960 to 1969. These data indicate that a higher percentage of the patients treated in the

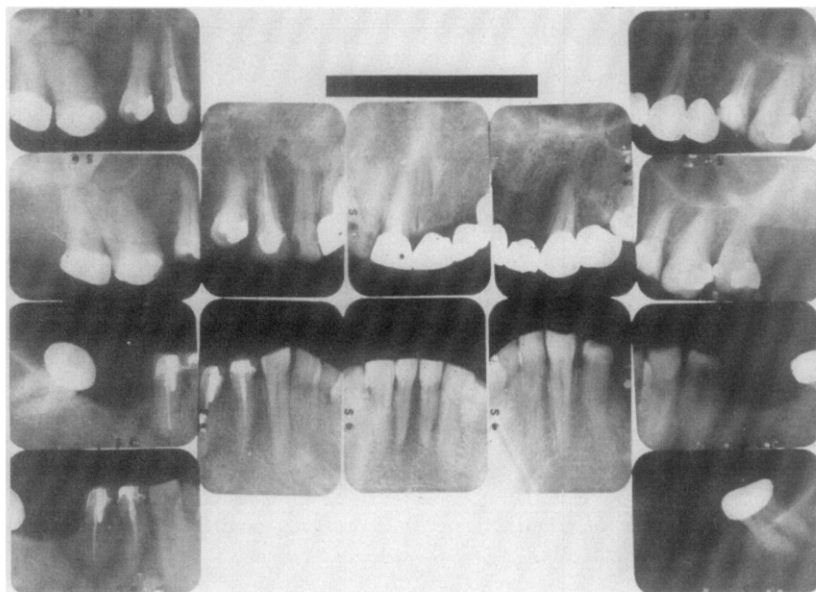


Fig. 3. Radiographs of dentition at start of therapy.

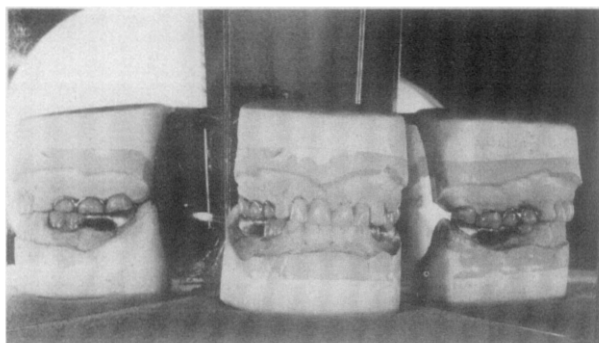


Fig. 4. Provisional prostheses designed to increase vertical dimension of occlusion and produce balanced occlusion.

earlier years were in better oral health at their last visit than those treated later. This may be explained by the percentage of patients with a good prognosis when treatment started. In 1930 to 1939, 27% had a good prognosis; in 1940 to 1949, 17%; in 1950 to 1959, 10%; and in 1960 to 1969, only 8% had good prognoses.

DISCUSSION

The goal in reconstructive dental therapy is to provide the patient with an esthetic, functioning, stomatognathic system, in which the progress of degenerative disease is arrested or at least retarded. Such an ideal result may be elusive. The mouth presents a hostile environment to its natural and

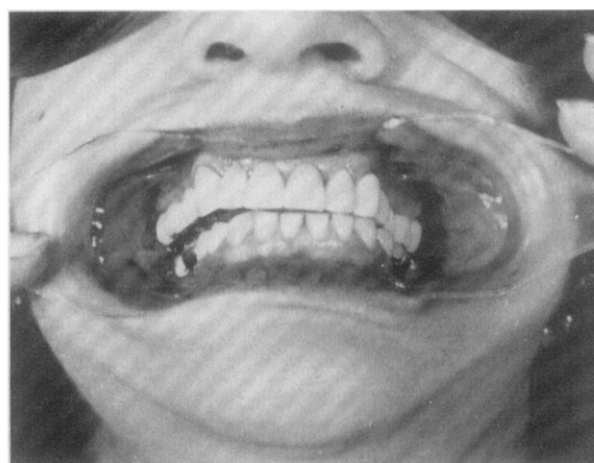


Fig. 5. Inserted permanent restorations showing left working and right balancing occlusion.

prosthetic components. The patient's ability to contribute to and maintain oral hygiene requires diligent concentration. Such cooperation is not easily attained. Nevertheless, the degree of success of rehabilitation justifies the practice. Patients may anticipate reasonable function, comfort, esthetics, and durability.

Despite degenerative age changes and a lack of reasonable home care, some patients manage to preserve the last vestiges of a mutilated dentition. One 65-year-old woman presented with 19 periodontally involved teeth. Six teeth were removed. She

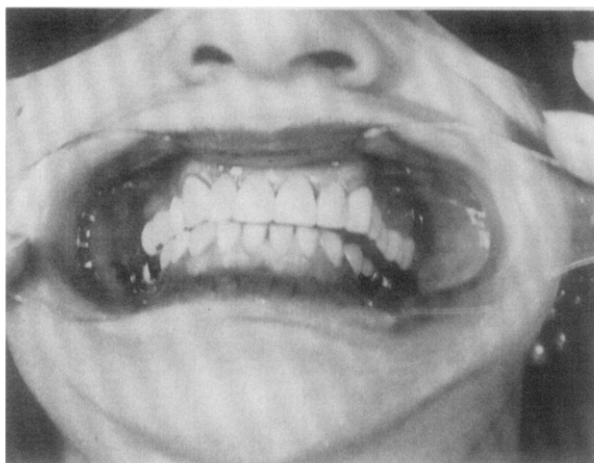


Fig. 6. Inserted permanent restorations showing right working and left balancing occlusion.

refused to accept complete denture treatment. A removable partial denture replaced all but four remaining maxillary teeth, and a removable partial mandibular denture was also constructed. When last seen, 21 years after completion, all 13 teeth and the prostheses were functioning well. Her oral hygiene remained inadequate.

Another patient, a 55-year-old woman with xerostomia and advanced dental caries eagerly agreed to a fixed partial prosthesis. At the completion of treatment, she retained 17 teeth, three of which were vital. When last seen, 11 years after completion of treatment, she had lost one tooth. Her supporting tissues had not deteriorated.

A third patient, 38 years of age, wore a complete maxillary denture. Her five mandibular incisors supported a removable partial denture. The five teeth were still functioning well when she died 27 years later, although a new removable partial denture had been constructed.

For the 32 patients treated with conformational dentistry, a simple unilateral or Stephens articulator was used. With such an articulator, no face-bow, Bennett movement, or registration of the axis orbital plane is necessary. The setting for the temporomandibular joint is arbitrary. The patient's centric relation is maintained. For the most part, the maxillo-mandibular relations of the completed treatment conform with that which was originally presented. For the 23 patients who were treated at one time, the postinsertion average was 18 or more years. Eleven patients had good results, nine were fair, and three were poor. Patients who were treated intermittently

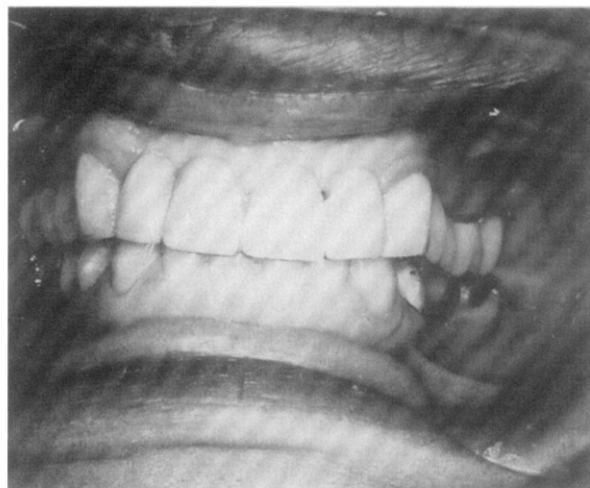


Fig. 7. Restored dentition 17 years after completion.

averaged 34 years posttherapy. At their last visit, three patients had a good result, three had a fair result, and three had a poor result. For the entire group of 32 patients, 24 had a good or fair result, and six had a poor result. These 32 patients fared as well as the 138 others for whom more accurate records were used and semianatomic as well as full anatomic or Hanau Arcon articulators were used.

Certain findings, after 50 years of practice, were meaningful. A large majority of the patients with good prognoses maintained good dental health. A lesser percentage of patients with fair or poor prognoses improved with time. Women held a slight advantage over men in maintaining good dental health. Age favored patients under 50 years when the prognosis was good.

Increasing the vertical dimension of occlusion did not consistently influence the results. Prostheses in which working and balancing occlusion were produced for 27 patients failed to demonstrate superior results. For some patients, both an increased vertical dimension of occlusion and balancing occlusion was provided. Figs. 1 and 2 show the dentition of a 41-year-old patient at the first visit. Fig. 3 shows her radiographs at the time of examination. The treatment plan included increasing the vertical dimension of occlusion and establishing a balanced occlusion. This was first attained with fixed temporary prostheses (Fig. 4), for a trial period. The patient adapted well to the increased vertical dimension of occlusion, and the permanent restorations were inserted 8 months later. The increased vertical dimension and balanced occlusion were included in

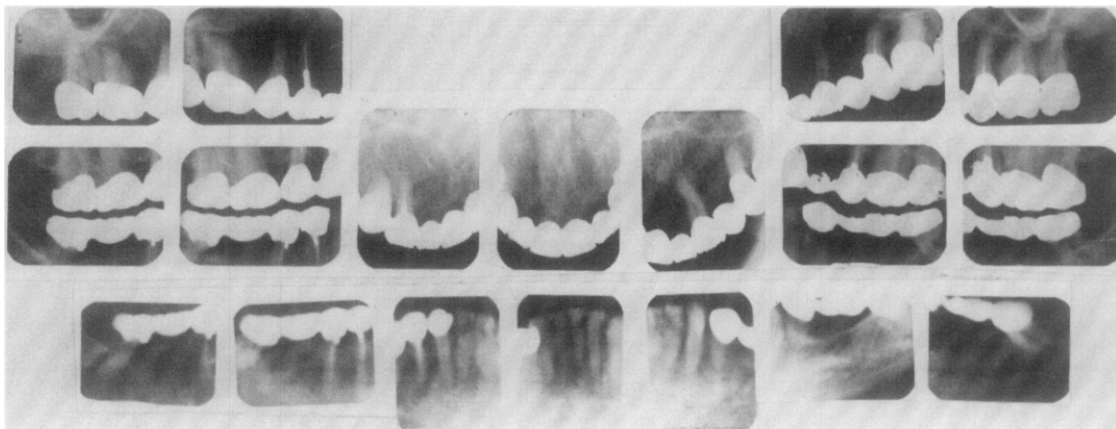


Fig. 8. Radiographs made 23 years after completion.

the final restorations (Figs. 5 and 6). Fig. 7 shows the reconstructed dentition 17 years later. Radiographs taken 23 years postinsertion illustrate the stability of the supporting tissues and restorations (Fig. 8). Similar results were attained when the existing vertical dimension of occlusion and/or lack of balance were retained.

Based on each decade of practice, the qualitative results declined with time (Table VI). This may be explained by the reduction of patients with good prognoses when treatment started and the acceptance of patients with less favorable prognoses.

CONCLUSIONS

The merit of rehabilitation was sustained by the experiences of 50 years of practice. Dental therapy must reject the concept of permanence. The cardinal point is that mutilated dentitions may be restored to health and serve to create a nonpathogenic stoma-

tognathic system for a satisfactory period. With careful evaluation, the prognosis should allow the dentist to inform the patient of the life expectancy of reconstruction.

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REFERENCES

1. Schweitzer, J. M.: *Restorative Dentistry*. St. Louis, 1947, The C. V. Mosby Co.
2. Schweitzer, J. M.: *Oral Rehabilitation*. St. Louis, 1951, The C. V. Mosby Co.
3. Schweitzer, J. M.: *Oral Rehabilitation. Problem Cases*. St. Louis, 1964, The C. V. Mosby Co.

Reprint requests to:

DR. JEROME M. SCHWEITZER
745 FIFTH AVE.
NEW YORK, NY 10022