

Dr. Eugen End

Physiological Occlusion of Human Dentition

Diagnosis & Treatment



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Dr. Eugen End

Physiological Occlusion of Human Dentition – Diagnosis and Treatment

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Preface

The so-called scientific nature of occlusal concepts is a controversial issue. What may have been founded on a plausible theoretical basis for years is often simply accepted without any further clinical evaluation. Before we know it, based on clinical acceptance, they are deemed scientifically evident and these theories are accepted as correct for daily clinical application. The objective of any study should be to evaluate the scientific evidence of the proposed concept. The scientific basis for these studies was established long ago. Theophrastus Bombastus of Hohenheim (1493 – 1541) – better known as Paracelsus – is still considered today to be the founder of a modern understanding of science. He defines the basis of scientific activity as unbiased observation. The merit of this author is that he has done precisely this consistently over a number of years. The results of these observations are presented in this book, and the logical conclusion is the concept of physiologically based occlusion. That is why this new publication deserves our undivided attention. It analyzes, summarizes and develops new perspectives on occlusion – a subject we actually thought we already knew all the theories and explanation models.

Witten, Germany, May 2005

Prof. Dr. Axel Zöllner

Foreword

It is a result of occlusion that the temporomandibular joint is the only human joint with a fixed end point. Both the centric support and the vertical adjustment via the posterior teeth make the physiological adjustment of the discus/condyle complex with reference to the temporal joint structures possible. Even if the significance of occlusion for maintaining the health of the masticatory organ has recently become increasingly disputed, there is nevertheless no doubt that an non-functional occlusion can lead to dysfunctions of the stomatognathic system.

It is a good thing, therefore, that the author has made biological occlusion the subject of this book. His main interest is focused on the correct three-dimensional adjustment of the centric with stable point-contact support in the main centre of occlusal force. According to his observations of numerous healthy dentitions in every age group, the number of occlusal contacts increases in the area of the second premolar and the first molar. This is in keeping with the habilitation treatise of my former colleague, P. Rammelsberg, who has statistically proven that the loss of the vertical support zone in the posterior area can be seen as a risk factor for the development of structural joint alterations.

According to Dr. End's philosophy the reconstruction of lost tooth substance is thus not to be seen as a single, isolated structure which must be reconstructed, as it were, in a vacuum. The occlusal reconstruction is individually variable in a neuromuscular sense and within certain limits. True to the anatomical principle of the reproduction of form and function, our goal should always be the axial loading of the tooth.

This book provides valuable hints to the dental technician not only for the design of the occlusal surface, but also for the tooth in its entirety. Dental students are given useful basic principles and instructions – particularly valuable for their first semester – with regard to the correct anatomy of the teeth. For all types of prosthetic rehabilitation from the single crown to complete denture prosthetics, this book offers the dental practitioner not rigid, mechanistic rules, but more flexible general guidelines based on biological and neuromuscular principles.

In this context I would like to offer my best wishes for the wide circulation of this book and the principle of bio-logical prosthetics.

Munich, Germany, May 30, 2005

Prof. Dr. Dr. h.c. W. Gernet

Foreword

With this book I would like to create a true – and truly infectious – atmosphere of learning, in which every reader can compare his and my viewpoint with the various different schools of thought and offer criticism with an open-minded attitude. My own point of view is based on the principles of natural dentition. This book is simply the result of my observations of nature, which I have emulated and taken as the basis for my work.

The development process of the theories on this subject should be kept in motion by a creative and critical spirit, while at the same time exercising rigorous discipline in one's thinking.

Throughout the course of the years, I have had the opportunity to communicate with a great many people, make extensive studies of the literature and gather experience as a dental practitioner in order to develop both in theory and practice the observations made from nature.

It all began with a study of 60 natural dentitions which I carried out in collaboration with my friend Hermann Geldreich during my studies at the Department of Conservative Dentistry of the University of Frei-

burg under the leadership of Prof. M. S. Schreiber and Senior Physician Dr. B. Klai-ber in 1976.

The controversial discussion on occlusion, the differing practical applications in the departments of the Faculty of Dentistry, the discrepancy between the theoretical postulates and the possibility of their practical application left me in a state of perplexity. I sought the answer in nature and in naturally conserved dentition. What I discovered in its diagnosis and studies of the literature moved me to devote myself to this subject with even greater enthusiasm than before.

I was thus influenced to a great extent, for example, by the insights of Dr. Carl Hiltbrand, who distanced himself at an early stage from the mechanical articulation theory in favor of the dynamic, physiological approach. It is interesting to see that problems in dentistry which are now once again topical have already been discussed decades before this. It is rather astonishing, and hardly surprising that the fundamental results obtained in 1978 by H.C. Lundeen and Ch. H. Gibbs on the human process of mastication to this day still do not have the standing they deserve in view of their significance for their implementation in the manufacture of dental restora-

tions. Their experimental results correspond to my observations of the conservation of tooth morphology under physiological conditions.

I was further helped to understand the physiological movements of the mandible by the results of the classical experiment by W.Gernet. He observed the proprioceptive behaviour of the control of mandibular movements in patients with good occlusion and those with inbuilt occlusal interferences. He used the mandibular kinesiography to record the speed at which the centric is taken up with and without premature contacts.

During my studies he was an Assistant in the Prosthetics Department of the University of Freiburg under Prof. Dr. W. Reither, and at all times maintained a critical and analytical stance towards all theories.

It was Prof. Dr. A. Puff who made me sit up and pay attention in his anatomy lectures when he spoke of his knowledge about the physiological anatomy of the mandible; that according to radiocinematographic studies the mandibular movement slows down shortly before centric contact occurs, and is subsequently brought into a new opening movement by a kind of switch in the direction of movement.

The gnathological era, gave me the opportunity during my first semester in dentistry in Munich to study the waxup technique according to E. V. Payne and H. C. Lundeen. However, this experience clashed with my growing understanding of physiological occlusion in the fact that in addition to waxed-up occlusal surfaces it was also customary to set up partial dentures with reduced and simplified occlusal relief patterns.

Functional analyses in diagnosis and therapy according to Arne G. Lauritzen showed me the more technical static and mechanical correlations between the temporomandibular joint, tooth guidance, teeth in the dental arch and occlusal surface design. They were largely based on geometrical principles. In accordance with these principles it was sought to construct and to find centres of movement that were responsible for the paths of movement of the mandible in relation to the maxilla under tooth and joint guidance.

From the 1960s to the 1980s mandibular movements were predominantly understood as ideal movements. The hinge axis was determined and the border movements and other parameters such as the horizontal condylar path inclination, the Bennett angle, the intercondylar distance

and the side-shift were recorded. These were mounted in partially or fully programmed articulators in different, assumed, ideal centric positions

The analysis of natural dentitions and their deductive anatomical and physiological interpretation awakened in me the understanding that we cannot find a finished template of a centric position in the mechanical sense. It is much more a question of finding a way of working in a biological environment.

As a dental student from 1972 to 1977 I was obliged to make complete denture prostheses with bilateral balancing and was tested on this in my State Examination. Gausch, however, began in 1976 to introduce anterior/canine guidance to the therapy of complete denture prosthetics. Anterior/canine guidance was, and still is, for many authors today, the domain for fixed dental restorations. One example I have experienced is vehemently and uncompromisingly represented in continuing education courses by Bob Lee in the Kempten study group.

With increasing knowledge and experience gained from the observation of natural dentition, I continued to rely more and more on neuromuscular guidance. From 1977

onwards I departed farther and farther from the concepts of tooth and joint guidance.

In the 1980s and 1990s the departure from statics towards more dynamics and function was revealed in the biomechanical theories, represented by Freesmeyer, Slaveicek, Kubein-Meesenburg, Polz or Schulz.

The considerations with regard to muscular dynamics of Graber, W. Gernet, B. Jenkelson and W. Schöttl have recently begun to challenge many dogmas to date. Their observations demonstrate with increasing clarity that the movements of the mandible cannot be performed and recorded with acrobic mechanical precision, but that it moves biologically in a flowing balance that is controlled by regulatory mechanisms.

Armed with the fundamental insights gained from naturally conserved dentitions and with their anatomical, physiological and deductive theory of cognition, it was at times highly interesting to observe the development of traditionally accepted occlusal theories.

As a student in 1976 I went to Vita Zahnfabrik in Bad Säckingen with a set of posterior teeth I had modelled myself in kee-

ping with this new concept of occlusion. I had the idea of having denture teeth produced according to nature's example. Dentistry was primarily in the gnathological 'spirit of the age', however, and it was agreed to delay design and manufacturing of these dentures for another ten years. Mr. Henry J. Rauter kept a watchful eye on developments and sensed when a change began to occur. It is he to whom I am most gratefully indebted. In 1986 he introduced the beginning of the technological development of an artificial tooth according to nature's example. This led the way in 1992 to Physiodens becoming our model in terms of form and philosophy for a whole new generation of prosthetic teeth.

I would like to mention Martha Freyer an indefatigable and undaunting member of the product management for teeth; she was regrettably obliged to leave the field due to health reasons in 1998. With her expertise, single-minded sense of purpose and sheer ability to get things done, she "sponsored" the new teeth. I would like to take this opportunity to express my special thanks to her.

In Viktor Fürgut, dental technician and departmental manager of the acrylics prosthetics department of the laboratory Ulrich Götsch in Ravensburg, I have the good for-

tune of an outstanding partner in dental technology. Viktor has systematically developed the physiological theory of cognition and implemented it biologically par excellence in the set-up of complete and partial dentures.

His work strives to perfection – but without losing an ounce of its practice-oriented approach. Even complete denture prostheses, virtually indistinguishable from nature in shade and form, can be easily integrated into his procedure in the day-to-day routine of the dental laboratory. I would like to offer him my very special and sincere thanks. Ms. Solvey Bossen modelled the Physiodens anteriors and is also responsible for the illustrations in Part C of this book, "Physiology applied to the modelation of teeth in fixed dental restorations". Helmut Silmann placed at our disposal his expertise in dental technology by assisting in the modelation of the posteriors.

I would also like to offer my warmest thanks to Ulrich Götsch, Master Dental Technician and proprietor of the dental laboratory, for his generosity in putting his materials and the time and know-how of his employees at our disposal.

My patients and I have had the benefit of 25 years of his dental technology experience, and the standards he sets are a source of inspiration to his laboratory team.

Christoph Freihöffer, Master Dental Technician, began in his daily work – initially unknown to me – to wax up and layer crowns in functional occlusion according to my Physiodens set-up brochure. His improved results and his successes even in problem cases, his expertise and knowledge thus brought us together, so that I am grateful to him to now have the opportunity of holding courses jointly with him in bio-logical prosthetics in the field of fixed dental restorations.

While working on the manuscript I found a dedicated assistant in Frieder Bertele, who put the handwritten work and photographs I submitted onto reproducible data media in the form required by the publishers. The word processing was undertaken by Steffi Schmid; I am much obliged to both of them.

Without the excellent assistance of my professionally trained dental assistants over many years with the innumerable typing assignments, analyses and dental assistance tasks, this successful teamwork such would not have been possible. I would therefore particularly like to thank Cornelia Bucher, Helga Foss-Roos and Irina Frei.

My wife and my daughter Eva were obliged to make many sacrifices during the years of the development of the Physiodens teeth,

the continuing education courses and not least this book, for which I would like to give them too my warmest thanks.

To my daughter Anne, who is studying dentistry in her 4th semester, I would like to give an illuminating insight into the problematics of occlusion. And for my daughter Andrea, a student of law, I would like to impart the most important principle of justice: “Audiatur et altera pars” (listen also to the other side), also a basic principle for me, to which I add, “et credi poco” (and believe little).

As a student of medicine, my daughter Katrin can critically examine the aspects of medicine and their deduction from nature. For my stepdaughter Anna I quote a sentence from Nikos Kazantzakis: “Everything which does not exist we have not desired enough”.

My warm thanks go to Mrs. Louise Cyffka for the English translation of my book. She translated the difficult text with interest and love for the subject.

And finally, I would like to express my sincere thanks for the excellent collaboration of the publisher Neuer Merkur.

Ravensburg/Weingarten, Germany,
October 2004

Eugen End

Introduction

There is hardly a more heated topic for discussion in the field of dentistry than the fundamental principles of occlusion, their functionally oriented diagnostics, treatment planning and therapy in our masticatory system.

The main aspect of dental occlusion which tends to frustrate students of dentistry, dental technicians and dentists alike is the deep chasm that exists between the different schools of thought in the sector of occlusal therapy. The existing therapeutic requirements were – and still are today – in conflict with the possibilities for their practical implementation on a consistent basis.

At the time I was a student of dentistry from 1972 till 1977, the concept of bilaterally balanced occlusion (Gysi, Spee, and McCollum) was predominant. In the field of fixed partial dentures the concepts of group guidance (Schuyler, Pankey, Mann, Ramfjord, Slaviceck) and anterior guidance (Dawson, D'Amico, Lee, Lauritzen) were controversially discussed and practically implemented in different ways. In orthodontics, the classification criterion for normal occlusal relationships in the ante-

rior area was considered to be an overbite of 2 to 3 mm (Schulze, Rakosi). Unfortunately the results often permitted tooth guidance or group guidance with freedom in balancing either with great difficulty or not at all.

Partial dentures and combinations of partial and complete denture prosthetics cases with fixed dental restorations or natural dentition were caught up – as they still are today – between the various theoretical and practical demands made on occlusion with regard to statics and dynamics. In terms of the history of dentistry, the concepts in dynamic and static occlusion had developed mainly from the discipline of complete denture prosthetics, since this is the area that requires the complete new design of the dental arches.

By the early 1950s recognition was beginning to emerge that the concept of bilateral balancing can result in unphysiological stresses on natural dentition. Furthermore, that these stresses in turn can give rise to parafunctions which may damage the hard tooth substance as well as the surrounding periodontal tissue.

In 1976 Gausch began to introduce anterior/canine guidance to the field of complete denture prosthetics. As a result of

his studies (published in 1986 in the German periodical DZZ) and the Innsbruck school of thought that followed him, we know today that complete denture prostheses function also with anterior guidance.

Also in the field of static occlusion the concepts differ in terms of the number of contact points, their position and whether they are point or area contacts. A much-debated topic both in theory and in terms of its practical implementation is whether the contacts take place in habitual intercuspation, in a more ventral or retral contact position firmly anchored with maximal intercuspation, or with more freedom in the centric position

In the concept of "point-centric" habitual intercuspation and the retral contact position with maximum multi-point contact concur and result in a maxillomandibular relation so that freedom of movement is not given in this position.

In the concept of "long-centric" no interlocking takes place in centric occlusion, but instead a sagittal mandibular movement under tooth contact which allows more freedom within an occlusal space with a sagittal extension of approximately 0.2 – 0.8 mm (Dawson) with point-area support. In the concept of "freedom in centric" the

mandible is given more freedom of movement by means of freedom in the anterior/canine area within this centric occlusal space on both sides, also in the initial phase of tooth-guided excursion movements.

Our masticatory system has evolved slowly over the millennia. Theories of occlusion have undergone a transformation in the course of the last 100 years; these co-exist in controversy with one another, with different concepts all competing to attain scientific recognition.

Scientific discoveries, however, cannot be ultimate truths (Popper). The sciences and the arts have always been subjected to challenge with regard to the dogmas they have established, and have thus been obliged to question themselves.

They have developed in the course of their history from observations, experiences, experiments, concepts and critical discussions. Discoveries and insights are only temporarily certain. There is no guarantee that they will be disproved at a later date. Unremitting skepticism is essential in all scientific disciplines.

Our theories of cognition must be subjected to ongoing critical evaluation. If they

can withstand this scrutiny on a continual basis they will gain an ever-increasing degree of reliability and scientific stature.

Considering the interpretation of the meaning of the concept of scientific stature, we must come to the conclusion that it has been significantly altered in the course of history.

With Aristotle introduced to the field of science the inductive method of reasoning by means of experiments, and to a great extent did not permit doubt with regard to established scientific dogmas.

The paradigm, i.e. the current scientific understanding of a subject area of the age, is, however, very strongly influenced by the individual who performs the experimental study and consequently sets up a dogma (Kant). Secondly, the finite number of experiments can have only a limited significance in the finding of truth (Hume). A paradigm shift can take place only when we make the effort to think critically and outside the confines of our acquired and programmed ways of thinking, and to logically deduce our conclusions from this.

In the scientific way of thinking we should return to the critical rationalism of the Pre-Socratic philosophers, who spoke not of

an absolute truth, but placed the main emphasis on the hypothesis itself and the formulation of a question. (Parmenides, Heraclitus). When asked about their knowledge they replied: "I do not know; I am merely making an assumption. And if you are interested in my problem, then I am gratified at your critical doubt and subsequent confirmation, amendment or refutation of my hypothesis".

In the words of Albert Einstein: "Assumption is more vital than knowledge. The mere formulation of a problem is often more quintessential than its solution, which is merely a matter of mathematical or experimental dexterity. To pose new questions and to view old problems from a new perspective requires creative vision and characterizes true progress in science".

Our knowledge, not only in the field of medicine, must establish itself in the face of ongoing critical evaluation. It thereby gains an increasing degree of reliability and under these premises is considered under today's criteria to be scientifically recognized. New insights may correct, or may even be the downfall of previous ones, as illustrated by numerous examples from all scientific disciplines. In science as well as in practice we should have learned by now that it is premature to regard laws as definitive and universally applicable. Our per-

spective today is moving away from the static, linear and mechanical towards a wider, more flexible and dynamic model that permits what I like to call “flowing balances”.

“Panta rhei – everything flows” was the quintessence of the epistemology of the Greek philosopher Heraclitus of Ephesus. This originated 2,500 years before his time and is regaining a whole new significance today.

The concept of flowing balances in fact does not permit definitive laws as such, but at the most general principles. These provide a framework which allows a certain degree of freedom; not, however, total freedom, but freedom within a permitted spectrum and according to certain “rules of the game” as it were. One must even set up the hypothesis that it is in fact not always possible to set up definitive solutions.

The dilemma posed by the differing occlusion concepts and what is expected of their practical implementation is illustrated in the following quotes. As Ramfjord says: “Neither the point-centric nor the long centric nor the freedom in centric concept is to be found in normal human dentition. There is no scientific proof for the

assumption of canine guidance or canine protection as the criterion for an ideal occlusion.”

Hofmann states: “All forms of occlusion occur in nature, even if according to our observations to date absolute canine guidance with direct disclusion is exceedingly rare.”

This was the climate of uncertainty which prevailed at the time I was a student of dentistry in 1976 I came to ask myself the following simple questions:

- ▶▶ What is the occlusion concept of natural, healthy, intact, physiologically functioning dentition?
- ▶▶ What is the occlusion concept of nature?
- ▶▶ Does nature in fact use one of the existing static and dynamic concepts which have been therapeutically postulated to date?

I sought and found the answer in the diagnosis of natural, healthy, intact, physiologically functioning and untreated, or virtually untreated dentition, on which I carried out clinical and functional analyses. I chose particular dentitions for this purpose according to the following selection criteria:

- ▶▶ They had to have no or virtually no abraded surfaces. I disregarded minimal abraded surfaces of up to 1 mm.
- ▶▶ I accepted small occlusal fillings in the depth of fissures or small anterior fillings which did not alter the anatomy.
- ▶▶ The dentitions had to correspond, or nearly correspond, to Angle's class I.
- ▶▶ The test subjects had not undergone orthodontic treatment.
- ▶▶ The test subjects had no pathological functional findings.

The questions to be asked in the diagnosis of these dentitions were:

1. Are there always abraded surfaces in our dentition, and are there abraded surfaces caused by anterior guidance – so-called anterior guidance surfaces – as working surfaces on the working side or balancing surfaces on the balancing side?
2. Where are the contact points situated in habitual intercuspation under light touch contact, and how many are there?
3. Is there a difference between the patient's habitual intercuspation and a re-

laxed, comfortable, neuromuscularly adopted centric position that is taken up by the patient himself any number of times from the rest position of the mandible in a comfortable, upright bodily posture without effort and without external manipulation?

The diagnostic results of these naturally conserved dentitions share common features with theories to date. They also deviate, however, from the therapeutic postulates of the classical concepts and even entail experiences to the contrary.

I would like to emphasize at this point that I do not wish to discard the proven and established theories entirely, but rather to modify and supplement these. At the same time, however, I would also like to invite the reader to try and think outside the confines of the learned and acquired doctrines.

The application of these general principles of natural dentition to any type of prosthetic treatment has come to be called "Bio-logical Prosthetics". Bio-logical Prosthetics is the diagnostic principle of the occlusion of natural, healthy dentition. It can be universally applied to fixed and removable, partial and complete denture prosthetics as well as implant and combination prosthetics.

Knowledge – or the attainment of knowledge – begins with the formulation of a hypothesis. “He who does not expect the unexpected shall not find it; it will remain undiscoverable and inaccessible to him.” This quotation from Democritus testifies to the assumptive nature of human knowledge – which affirms the necessity and calls for the courage to anticipate boldly that which we do not know, and in so doing, to prove the theories to be valid, and their originators to have taken the right path in the end.

PART A

The anatomy of natural dentition

1. Function and tooth mould

The answer to the first question as to whether abraded surfaces must always be present in our dentition must be answered with a definite “no”.

▶ **The conservation of natural tooth morphology is found in all age groups all the way from youthful to very elderly dentition!**



fig. 1 21-year old UJ



fig. 2 21-year old LJ



fig. 3 25-year-old UJ



fig. 4 30-year-old UJ



fig. 5 30-year-old UJ



fig. 6 37-year-old UJ



fig. 7 43-year-old UJ



fig. 8 70-year-old UJ

Tooth morphology is functional. Teeth have retained their form and positional relation to one another in order to each fulfill their own unique task of the gripping and the processing of food for the duration of our entire lifetime. Intact natural dentition observed in teeth of all ages up to very elderly (figs. 1 to 8) shows that nature has equipped the chewing organ in such a way that the basic tooth morphology is physiologically conserved and not destroyed. –This conservation serves the purpose of fulfilling, for the organism as a whole, the tasks specific to each individual tooth. Correspondingly, each tooth has a different morphology according to its particular function and as we shall see later, also different contact points.

The anterior teeth must be able to bite off food and to hold it. The expression "incisors" refers only to a part of their function. The incisors form a functional unit with the canines with the overall purpose of holding the food while it is bitten so that we are able to tear it off using our hand. That is why the upper incisors have a trapezoid form, while the lower incisors are more wedge-shaped.

They are not razor-sharp for the purpose of cutting, but are rather blunt. The upper incisors also have an incisal edge with a ridge-like thickness. The canines are the

strongest and most sensitive biting and holding organs, and according to this purpose, have a corresponding crown and root anatomy (see Part C on the modelation of physiological tooth forms).

The evolutionary development of the teeth has resulted in optimized functional morphology which serves the purpose of the intake and the processing of food. After the biting off and/or the intake of food, the food bolus is conveyed to the posterior area via the premolars with the aid of the lips, cheek and tongue. The shape of the first premolars reflects their functional morphology as a transitional function between the initial gripping and the subsequent processing of the food. Thus the first upper premolars still display a pronounced buccal cusp which supports the holding function of the canine for the purpose of biting off hard and tough food that is brought into this area. The second premolars and the molars have the task of processing the food. Their functions too are likewise reflected in their morphology, which I shall explain in detail in Part 2, "The Modelation of Physiological Tooth Forms".

The food is held, rotated, turned over, and moved from one side of the mouth to the other, covered in saliva and processed to a bolus on the narrow corridor of the row of teeth by means of the tongue and the

cheeks and the opening and closing movements of the mandible until it is finally expelled reflectorily from the oral cavity by the act of swallowing. Balters referred to this as the chewing corridor. Functionally the chewing corridors on the left and the right-hand side of the oral cavity are connected to one another via the tongue/palatal area within an enclosed chewing space.

The comparison of the anterior tooth and the occlusal surface morphology of naturally conserved dentition show that the relief design is characterized by a high degree of individuality.

The morphology of natural tooth moulds varies from delicate and intricate to clear and simple structures. Nevertheless the typically recurring characteristic of each tooth can be recognized. Furthermore, the teeth of the left and right quadrants are not entirely symmetrical – in the same way as our face, and in fact the whole human body is not exactly symmetrical. We need to break free from the postulate of absolute symmetry and complete harmony with standardized, waxed-up occlusal surfaces. Nature itself is our model – no less – and it makes no sense whatsoever to try to alter and improve on nature's example. Tooth morphology remains unchanged for years and decades in its genetically deter-

mined, pre-eruptive form even after eruption from deciduous to permanent dentition (figs. 1 to 8).

▶▶ **The physiological activities of swallowing, chewing and speech do not lead to loss of tooth morphology.**

As dentition ages, the teeth will certainly show signs of use, but under physiological conditions it will never undergo the destruction and loss of the occlusal surface relief of the posterior or anterior tooth moulds, but its morphology will always be conserved.

▶▶ **Physiology conserves natural tooth morphology.**

2. The physiological centric

The distribution of the contact points in natural, healthy, physiologically functioning dentition deviates from the classical, static occlusion concepts – both in terms of the number and the position of the contacts.

In healthy dentition the patient's habitual bite (habitual intercuspation) corresponds to a neuromuscularly guided and adopted centric position. This position is taken up by the patient himself again and again from the rest position of the mandible effortlessly and without external manipulation in a relaxed, comfortable upright bodily posture.

This contact is called the physiological centric.

▶▶ The physiological centric of natural dentition

Taking a leaf out of nature's book – the principles of natural dentition:

1. Virtually homogeneous and simultaneous points of contact in the posterior area showing a typical distribution with an individual range of variation from tooth to tooth and patient to patient.
2. An average of ten contact points is to be found per quadrant in the posterior area ranging from 6 – 14 contact points.
3. The contact points are situated mainly on the working cusps – on the lingual cusps in the upper jaw and the buccal cusps in the lower jaw. They are located mainly at different heights on the inner slopes, but also centrally on the highest ridges.
4. There are fewer marginal ridge contacts.
5. There are fewer contacts on the inner slopes of the non-working cusps – these are located on the inner slopes of the buccal cusps in the upper jaw and the inner slopes of the lingual cusps in the lower jaw.
6. The anteriors can all, or only partially have contact, virtually homogeneously and simultaneously with the posteriors. Anterior contacts tend to be light touch contacts with an average of five contacts.

These six characteristic features represent general principles of natural dentition. These leaves taken from nature's book, however, are not static laws but more resemble general principles which leave scope for individual variation – and which are always to be understood as flowing balances.