

# Zprávy a bibliografie

## Berichte und Bibliographie

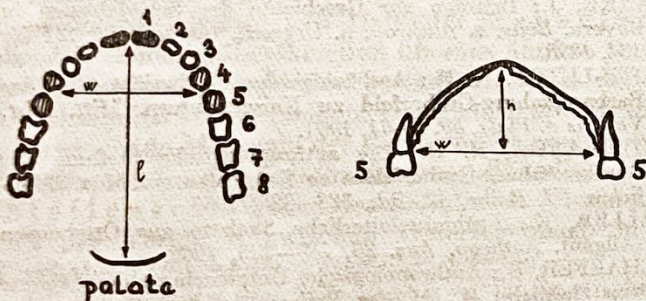
### News and Bibliographies

### Новости и библиография

#### PALATOMETER — A DEVICE FOR MEASURING THE BASIC DIMENSIONS OF HARD PALATE

MARIE TOLAROVÁ and JIRÍ GOTTWALD

In clinical practice as well as in research work, the need is frequently felt for a standard measuring device of hard palate, for the determination of characteristics of its vault and for the indication of the palate index. In clinical practice, mostly gauges or rods and other specific devices are employed



#### ALVEOLAR ARCH

w = width  
l = length  
h = height

#### PALATE VAULT

FIG. 1

A diagram showing the three basic dimensions of palate, namely the width, the height and the length (depth).

for measuring the basic (fundamental) dimensions of hard palate in oral cavity. All these facilities enable us to ascertain the three basic dimensions of the palate, namely the width of the palate, its length and its height. The width of the palate is a distance limited at its two ends by the intradental slots between the the fourth and fifth teeth (Fig. 1), measured at the most cranial point of the teeth, i.e. at a place where same enters the alveolus; the length of the palate is a distance of the intradental slot between the upper incisor from the rear edge of the palate vault. Usually this segment line is normal to the preceding one but this need not be so in case of asymmetries. The height of the palate is defined by the length of the perpendicular, erected at the point of intersection of the length and the width of the palate respectively towards the palate vault.

These measures, including the palate index, are used in clinical medicine (Burian, 1954). In Anthropology (from

data taken on skeletal material) it is normally used measuring of the palatal width as the distance of lingual facets of the second molars (enm-enm). The length of palate is measured as an oral distance (ol) — staphylon (sta). Palatal index in Anthropology is called the relation of both described dimensionsthres the characteristic of the palatal arch.

Although several devices have been developed for measuring hard palate, they are mostly not in current use so that measuring by means of gauges still prevails. The absolute and relative inaccuracies of such a process are obvious and need not be further elaborated.

The oldest mention of a similar device may be found in 1899. It refers to the so called Siebenman palatometer (Siebenmann, 1899). Another specific device consisting of two arms (Schwarz, 1951) adjusted in the required position with the aid of a spring, controlled by a set screw, was also used for carrying out the necessary measurements (the so called "Korkhaus dreidimensionaler Zirkel"). In the course of such a process, only the height of the palate was ascertained by means of a rod provided with a scale while the width of the palate was measured with the two arms. A drawback of this device consists in that the arrangement of the end parts of the arms does not allow the fixation of the device in the oral cavity in the course of measurement and, moreover, in that expanding movement of the arms by means of the set screw proceeds at a very slow rate, indeed. On the other hand, the height of the palate does not necessarily intersect the width of the palate which results in inaccuracies of the determined palate index. The method of measuring the depth of the palate is utterly unreliable.

A similar device is the so called MARKWARDT "zweidimensionaler Meßzirkel" for measuring both the width and height of palate (Markwardt, W., 1965). The spacing of the arms is controlled by means of two screws for more coarse and more fine shifts. The height of the palate is measured with the aid of a special lever.

Still another device of similar design which is apparently intended to measure dimensions on skeleton materials only is the palatometer of the P. Hermann, Rickenbach und Sohn Company of Zürich (Martin, R., Saller, K. 1957). It serves for measuring the height of the palate on skeleton materials and consists of a gauge (placed during measurements vertically) and of a transversal arm. This latter arm serves for being fixed on to the alveolar projection of the upper jaw.

The device designed and developed by us has been given the name of "palatometer".

With the aid of the said palater we determine the space characteristic of the size (dimensions) of the palate and the shape of its arch (Figs 2, 3, and 4) in the oral cavity. It is possible to read all the three basic dimensions of the hard palate with the aid of the palatometer — namely its height, width and depth (length) — with one adjustment only. The mode of its fixation in the oral cavity ensures standard conditions of measurement for different patients. The device is able to be applied both in case of grown-up population as well as of children.

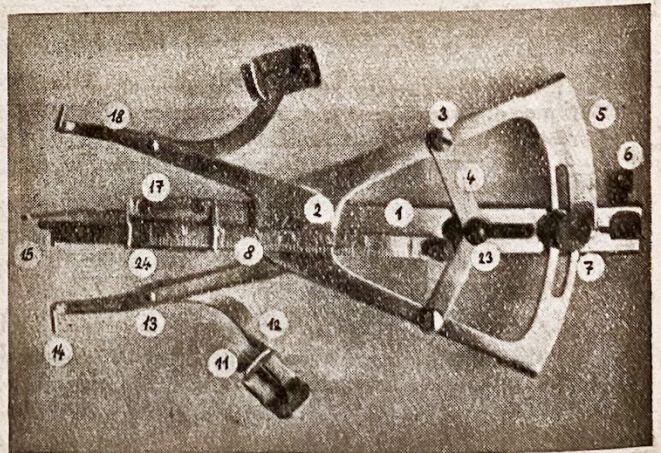


FIG. 2

Palatometer — a plan view.

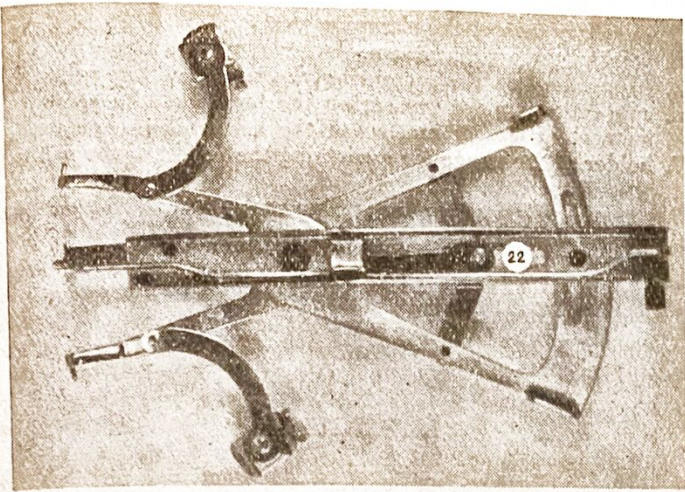


FIG. 3  
Palatometer — seen from below.

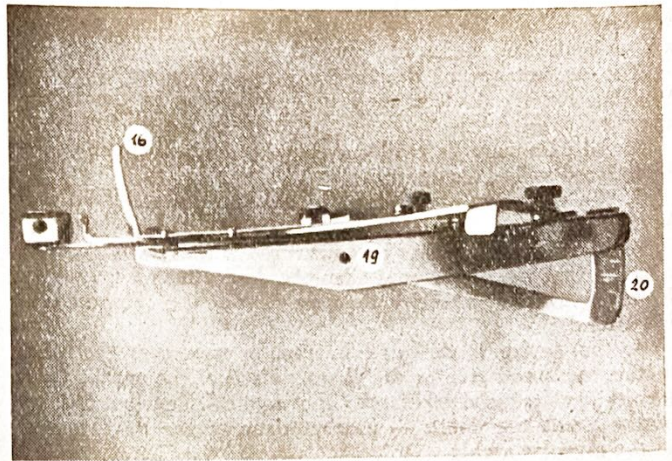


FIG. 4  
Palatometer — a side view.

The material, used for the production of such palatometer is stainless steel sheet since we want to be able to sterilize same continuously.

According to information gathered our palatometer represents the first successful effort to solve the problem of somatometry of hard palate in this way. Clinical tests confirmed its reliability and its applicability in clinical practice too. Measurements carried out with its aid are simple, quick, accurate and standard and, in addition, it meets the requirements of different anthropological measurements and tests.

The basic mechanism of the device consists of two collets fitted at their external parts with a spring ins such a way that the inner arms of the collets expand in the mouth until they reach the stop. The device is fixed in position by means of a pressure exerted on the inner pointed ends of the collets: the ends are wedged to form a triangle defined by the neighbouring inner ridges of the fourth and fifth teeth respectively and the ridge of the upper jaw. The third point, necessary for defining the standard plane for the purposes of measurements, is the lower ridge of the medium upper incisors (or more accurately the adjacent ridges of the biting edges), contacted during the measurements of the teeth by the upper portion of the device. The inner ends of the collets are deflected upwards: this brings about the necessary correction of the height of the frontal teeth (since the device is situated in a plane parallel to the plane of the hard palate alveolar projection). According to the mutual position of the interdental slot of the upper medium incisors and the longitudinal axis of the device, it is possible to determine the asymmetry, if any, of the two halves of the palate arch.

Measurement of the palate width: the collets are introduced in closed state into the mouth to be

thereupon adjusted so as to occupy the right position. In this position, the collets are fixed. The position is secured by means of tightening the screw which prevents any mutual shift of the collets. The dimension is read on a scale fastened to the external part of the device. For the purposes of measuring the palate length the upper part of the device is provided with a plane gauge which may be shifted into the oral cavity until it abutts against a stop. Thereupon, the dimension may be read directly from the scale engraved in same. A lever senser is designed for measuring the height of the palate. Its inner part comes into contact with the palate arch and the value of the dimension may be read from a scale, fastened to the external part of the lever.

The palate index is then calculated on hand of the data showing the height and the width of the palate. We may classify the palate on hand of the said index as appertaining into one of the following categories, namely: a wide (low) palate (whose index of palate is greater than 2) medium high palate (whose index equals to 2) heigh palate (with an index ranging from 1,5 to 2) and a gothic palate (whose index is smaller than 1,5) — see Fig. 5.

The measuring scales of all three dimensions are mutually correlated in such a way that all readings may be carried out with one initial adjustment and the following fixation of the device in the mouth. All the scales are provided with fixing screws so that it is possible to proceed with the reading after taking the device away from the mouth. The described fixation of the device is employed most frequently in the event of current, routine examination. If a more accurate fixation is needed in specific instances, there are provided, at the inner arms of the collets, movable fixing rods in the shape of "U" which may be put over the molares from

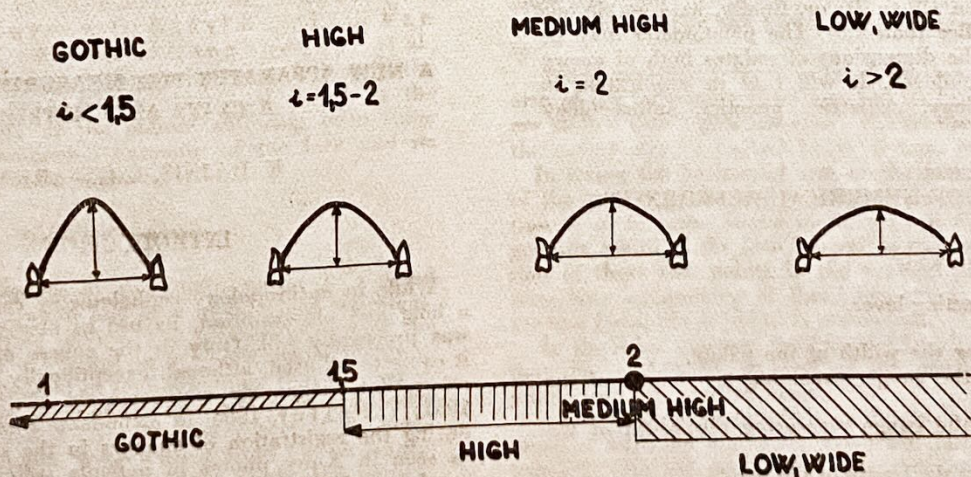


FIG. 5  
A diagram illustrating the classification of palates in accordance with the respective palate index.

beneath (behind the fourth and fifth teeth of the upper jaw) and tightened by means of a screw.

The advantages of the device proposed when compared to other similar devices, may be summed up in the following way, to wit:

1. All data may be read extraorally (but with the device introduced still in the mouth);
2. the device may be fixed in a generally standard way in the mouth;
3. all three dimensions are measured simultaneously: they may be first fixed and only then the device may be removed from the mouth (whereby the accuracy of the measurement is ensured);
4. the device is designed in such a way that the parameters measured give us the characteristic of the entire palate (or its architectural structure: the palate index characteristic of the vault the depth — characteristic of the development of the alveolar arch);
5. the device may be applied both in case of grown up population as well as in case of children (temporary and permanent teeth);
6. the device may be also used in the event of defective teeth;
7. measurements may be carried out with the aid of said device on live material, orthodontic models as well as on anthropologic skeleton material;
8. the properties of the device enable the operator of same to obtain a complex characteristic of hard palate, meeting all contemporary requirements. It may be used by plastic surgeons, by otorhinolaryngologists, stomatologist, pediatres, genetic workers, anthropologist as well as for constitutional and biological examinations.

#### SUMMARY

The authors describe a device, developed by them, which is protected by letters patent in the Czechoslovak Socialist Republic. The device, to which the name of "palatometer" was given, is destined for carrying out measurements of hard palate, more particularly measurements of the three basic dimensions of same, to wit: its width, its height and its depth (length). The device, made of steamless steel for making it possible to sterilize same in a continuous manner, is designed in such a way that all three dimensions may be measured simultaneously, in the course of one insertion of the device into the mouth. Reading of the dimensions measured is possible either with the device still inserted into the mouth, since all three scales are located extraorally, or the dimensions may be fixed on said scales by means of fixing screws and the operator may proceed with the reading only after removal of the device from the mouth. The data, obtained in this reliable and objective way, will enable the operator to determine the palate index of the patient and to classify the palate itself either as a broad (low) one (i.e. the index of which is greater than 2); or as a middle high one (i.e. with an index equalling to 2); or as a high one (with an index ranging between 1,5 to 2); or, finally, as a gothic one (whose index is smaller than 1,5). The palatometer may be used for measuring the dimensions of palates both of grown up persons and of children. It will find its application in surgery, otolaryngology, pediatrics, genetics, anthropology and stomatology.

#### DESCRIPTION OF NUMERICAL REFERENCES

1. supporting frame,
2. pin of the collets,
3. screw of the connecting lever,
4. connecting lever,
5. scale for indicating the width of the palate,
6. fixing screw for the gauge measuring the height of the palate,
7. fixing screw for the gauge measuring the width of the palate,
8. scale for indicating the length of the palate,
9. supporting point,
10. grips,
11. clamping screw,

12. auxiliary arm of the clamping part,
13. joint of the auxiliary arm,
14. supporting tip for measuring the width of the palate,
15. supporting tip for measuring the length of the palate,
16. supporting tip for measuring the height of the palate,
17. holder of the gauge for measuring the height of the palate,
18. arm of the collet,
19. pin of the gauge for measuring the height of the palate,
20. scales for indicating the dimensions of the height of the palate,
21. spring,
22. spring tightener,
23. coupling,
24. safety spring.

#### LITERATURE

- BLOCH, E.: *Ohrenheilkunde* 44, 1—10, 1903.  
BURIAN, F.: *Chirurgie rozštěpů rtu a patra*, SZdN, Praha 1954.  
CLANNING, W.: *J. Med. Science* 43, 72, 1897.  
CLANNING, W., WISSLER, C.: *Amer. J. Insanity* 61, 687 to 697, 1905.  
HARRISON, E.: *J. Med. Science* 49, 81—96, 1903.  
GORLIN, R. J., PINDBORG, J. J.: *Syndromes of the Head and Neck*, New York—Toronto—London, MxGraw-Hill Book Co., 1964.  
HRIVNÁKOVÁ, J., TOLAROVÁ, M., HAVLOVÁ, Z., RŮŽIČKOVÁ, J.: *Rozhl. Chir.* XLV, 523—532, 1966.  
LEBRET, M., LAURE, M. L.: *Fortschritte der Kieferorthopädie*, 27, 2, 1966.  
MARKWARDT, W.: *Ärztliche Jugendkunde*, 56, 5/6, 1965.  
MARKWARDT, W.: *Fortschritte der Kieferorthopädie*, 26, 1, 1965.  
MARTIN, R., SALLER, K.: *Lehrbuch der Anthropologie, Band I.* Stuttgart, 1957.  
SIEBENMANN: *Palatometr*, *Wiener med. Wochenschrift*, 1899.  
SCHWARZ, A. M.: *Lehrgang der Gebißregelung, Band I.*, 1951.  
TOLAROVÁ, M., HAVLOVÁ, Z., RŮŽIČKOVÁ, J.: *Acta chir. plast.* 9, 1, 1967.  
TOLAROVÁ, M., HAVLOVÁ, Z., RŮŽIČKOVÁ, J.: *Acta chir. plast.* 9, 3, 1967.  
TOLAROVÁ, M., HAVLOVÁ, Z., RŮŽIČKOVÁ, J.: *Plastic Surgery. Transactions of the Fourth International Congress on Plastic Surgery, Rome, 8—13, October, 1967.*

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#### A NEW APPARATUS FOR MEASURING THE FACE AND ITS ASYMMETRIES

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#### INTRODUCTION

While in anthropology cephalometry can look back upon a long and old tradition, its use in medicine until recently was practically nil. Only in the course of the past decade it came to be used, although exceptionally, e.g. in child neurology for diagnosing craniostenosis (V. Fetter et al., 1957; V. Fetter, 1958) in orthodontics and stomatosurgery during the registration of changes in the shape of the skull as seen in X-ray photos of patients suffering from cheilo-, gnatho- and palatoschisis (A. M. Schwarz, 1961), and in some other branches.

Recently, deliberate efforts, made towards objectivisation of some morphologic changes in the faces of patients suffer-