Dental Interference Fields: Recognition by means of Transitional Alveolar Ultra-Sound Diagnosis (TAU/CavitatTM) and Treatment Options

by Dr. med. dent. Norbert Guggenbichler
Osteolytic processes in the area of the jaw have been known for over 150 years. Natural Therapists are aware that dental foci of infection frequently constitute a treatment blockade. Unfortunately this knowledge is not so widespread among dentists. G.V. Black's works on the treatment of carious teeth are part of fundamental dental knowledge. However, his scientific works on the problems of jaw bone defects are largely unknown. So far the detection of such pathologies has remained the province of complementary medical procedures. Since 1994 a method has existed, supported by ultra-sound, of rendering bony defects visible, and since 2002 this procedure has been cleared for use for this purpose by the American FDA. In this article a brief introduction to this method will be given, illustrated with the aid of two patients' cases from the author's practice, with appropriate treatment options.

Clinical Relevance

Determining whether dental foci of infection are present is not as easy as one might think. Such processes are difficult to access diagnostically: independently of the quality of the x-ray images, pathological indications can only be obtained from an unsatisfactory percentage. This means that energy-based test procedures, such as Electroacupuncture or Kinesiology, are commonly used in order to obtain usable information.

Dental foci of infection are generally found in toothless areas after extraction (residual osteitis), in teeth with dead roots (granuloma, apical lucency, cysts), and in displaced wisdom teeth. These chronic processes are the consequence of acute disorders experienced previously, which in most cases involved inflammation or abscess formation (in the area of the dental medulla, at the root apex or in the gingival pocket).

Any case of pulpitis, any case of periodontitis, even a difficult dentition may develop into a chronic dental focal infection, when treated inter alia with the customary antibiotics. We must distinguish between areas where there is disintegration of the bony structure (osteolysis) and areas where the bony structure has become more dense (sclerosing). Low alveolar bone density is a risk factor for implants and is linked to a tendency to poor healing after traumas, infections or surgical interventions.

It is a similar case where the blood supply to the bone is deficient. The discovery of this may go hand-in-hand with painful conditions (of the head) that are difficult to type; this is referred to in more recent literature as NICO (neuralgia-inducing cavitational osteitis), see Fig. 1.

Description of the Problem

In 1915 G.V. Black, the founder of modern dentistry, described an osteomyelitis-like disease, which he called “chronic osteitis”: a slow dying off of the bone, with the appearance of intra-medullary alveolar defects measuring up to 5 cm. His astonishment was aroused by the fact that extensive bone destruction was able to exist without pus, redness or swelling, and frequently without pain (see Fig. 2).

Technology

The Cavitat™ machine, produced by the Cavitat Medical Technologies Co., works - to put it in
simple terms - by picking up varying electrical charges, released by ultra-sound. With the help of a computer these permit a three-dimensional representation of the bony substance in situ. The results thus obtained are known as TAU recordings.

Bone which has a normal blood-supply is an outstanding sound-conductor. If the blood-supply is not normal, then a noticeable weakening occurs in the intensity of the signal. The image is colour-coded: normal bone is shown in green; reduced blood-supply appears in yellow. Acute bone-necrosis is signalled by the colour orange, whilst red denotes devitalised bone (see Fig. 3).

Fig. 2: Large cavity (cavitation) in a mandible with severely reduced blood-supply, coloured generally brown (degenerate fatty and thready tissue) and a large osteosclerotic area (irregular white "island of bone")

Results of Studies

According to Bouquot, Shankland and Margolis, bone marrow edema and ischemic osteonecrosis are typically responsible for imaging procedures giving false negative results. After a pilot study had confirmed the diagnostic potential of the Cavitat™ machine, the procedure was checked by comparing TAU recordings with x-ray images of 170 sites in the jaw (involving 72 patients), with microscopically confirmed diagnosis. The findings were evaluated on a four-point scale, corresponding to the intensity or extent of the divergence between images. After this, the two procedures were compared with each other.

35% of the x-ray images showed no abnormality (false negative diagnosis); on the contrary, only one of the TAU images was completely unexceptional. The average classification for x-ray images of osteoporotic areas was 1.1, compared with an average classification of 3.5 of the TAU images. The evaluation of the x-ray images of bone with poor blood-supply amounted to 0.8, compared with 3.5 of the TAU images. 86% of the TAU images showed defects of a high degree (i.e. grade 3 or 4 defects), whereas only 9% of the positive x-ray findings were classified as high-degree.

Main Indications

Bouquot, Margolis and Shankland then pursued the question: to what extent can osteoporotic defects, alveolar bone with inadequate blood-supply, chronic osteomyelitis, osteosclerosis and dentogenous defects be diagnosed in the same way? 285 biopsy specimens were taken and evaluated, and initially x-ray and Cavitat™ imaging of each were undertaken.

To summarise, it can be said that, on the basis of microscopical examination following the biopsies, compared to the x-ray images the TAU images showed very considerable reliability and did justice to the severity of the disease.

The proportion of false positives from the TAU findings came to less than 3%. The Cavitat™ machine appears to be very effective in determining the presence of low bone density and areas lacking adequate blood-supply; however, it is less helpful in diagnosing dentogenous inflammations and cystic areas.

Fig. 3: 2-dimensional and 3-dimensional representation of two odontons (Case history 1)

Diagnostic Effectiveness

In a further study the diagnostic effectiveness and the required cost of interpretation were assessed. 92 jaw areas were examined, making use of orthopan...
tomography images, TAU diagnoses and intramedullary biopsies. The x-ray and TAU images were examined blind, and evaluated and compared independently of each other on a scale of 1-4.

Results: TAU diagnosis using the Cavitat™ machine proved significantly superior to x-ray in detecting histo-pathologically confirmed changes in the jaw area, of an osteoporotic nature or reduced bone density.

Nonetheless, x-ray images provide the first useable clues as to whether a TAU diagnosis is indicated, even though special training is required in the evaluation of striking features which are usually categorised as marginal (cf. Table 1).

**On the treatment of Osteonecrosis**

“Although many therapists refer to the disease-picture of osteonecrosis, or the pain syndrome resulting from it, as “bone cavities”, these empty spaces are really not the actual disease. They only represent an expression or a sign of the osteonecrosis, resulting from circulatory factors, a disease which has its origins in a long-term poor blood-supply of the bone-marrow chambers. It is true that curettage of the bony walls of such a defect removes the pain that it causes, or at least substantially reduces it.

<table>
<thead>
<tr>
<th>NICO defects and possible x-ray findings, Arranged in order of frequency of occurrence.</th>
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<tr>
<td>1. badly delimited radio-translucency</td>
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<tr>
<td>2. moth-hole-shaped radio-translucency (regional osteoporosis)</td>
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<tr>
<td>3. irregular small vertical stripes of bone in an area without teeth (laminary rain or laminary lightning)</td>
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<tr>
<td>4. slight radio-opacity like frosted glass (ghost marrow)</td>
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<tr>
<td>5. radio-opaque patches and dashes, lying centripetally around a central weak area of radio-lucency (eyrie)</td>
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<tr>
<td>6. focal destruction of the bony channel around the inferior alveolar nerve.</td>
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<tr>
<td>7. radio-lucency like soap-bubbles</td>
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<tr>
<td>8. horizontal stripes of bone in the area without teeth</td>
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<tr>
<td>9. focal destruction of the bony limits of the maxillary sinus</td>
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<tr>
<td>10. focal destruction of the external bone of the tooth socket</td>
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<tr>
<td>11. radio-opaque patches</td>
</tr>
<tr>
<td>12. radio-opacity like cotton-wool balls</td>
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Table 1: Drawn up by Dr. Shankland according to a pattern, and with the agreement of Jiao X, Meng Q: The influence of pathologic bone cavity of jaw bone on the etiopathology of trigeminal neuralgia. Acta Acad Med Sichuan 1981; 12:243-247

This effect probably originates from a combination:

- the removal of locally present toxins from dead bone and inflamed tissue (plus, in certain circumstances, bacteria)
- the relief of pressure from fluid or gas in the bone
- the stimulation of the blood-supply to the poorly-supplied bone

However, treating the bony defect does not amount to treating the disease itself. It is only addressing one sign of the disease and maybe one or two symptoms that are linked to it, such as pain, pressure or a burning sensation.”

(Translated from: www.maxillofacialcenter\Causesofosteonecrosis.mht. This website is not active anymore.)

**Examples of Treatment of NICO:**

For a long time, surgical cleaning of maxillary defects has been accepted as the only measure there is. Rau’s Intraosseous Neural Therapy (Stabident treatment/autonomic nervous system injection treatment) is not exactly regarded as a standard treatment for this indication, although reports as to its successful use are available. I regard Intraosseous Neural Therapy as a treatment option that is unjustly uncommon. Two treatment examples may show why:

1. Clinical example of a case of
pain arising from alveolar osteonecrosis. Mrs. C.S.
The patient C.S. d.o.b. 2.6.1957 came to my practice on 2.10.2007 because of problems in the region of the lower left 6 tooth. Problems had suddenly cropped up in the empty socket below a dental bridge. The x-ray showed an alveolar shadow, which has not changed over the years (see Fig. 5). She told me that for a week she had had a metallic taste in her mouth, a drawing sensation in the lower left quadrant, a slight swelling that could be felt on touch, and from time to time a throbbing pain with a drawing sensation in her ear; some time previously there had been sensitivity to cold and heat there. The lower left 6 tooth had been extracted more than 20 years previously. Clinically, on probing, using McMahon’s method, a slight tenderness on pressure was found vestibular from the missing tooth.

Treatment: I gave the patient C.S. an intraosseous injection containing NOTAKEHL® 5X, Hewedolor 1 ml, a SANUM combined injection 2 (SMI 2, see appendix), SANUVIS® drops, Argentum nitricum comp (OP Wala), and prescribed Pascoe’s Lymphdiaral Basis Tropfen N (20 drops 3 times a day orally); after one-and-a-half weeks gradually there was total remission of the problems.

On 27.11.2007 the patient (a nurse by profession) was talking about “miracle cure”. As some slight symptoms were persisting, I gave her a further intraosseous injection of Hewedolor and SANUM combined injection 1 (SMI 1, see appendix) that day, and on 3.1.2008 another injection of Hewedolor, ARTHROKEHLAN® A 6X, PEFRAKEHL® 6X and Os suis Injeel (Heel Co.). One year later, on 13.1.2009, the patient was still free of problems. However, an examination using Cavitat™ showed a grade 4 necrosis near both of the lower left teeth 6 and 8 (cf. Fig. 4).

The patient reported having had persistent hypertension for three years. Because of a myoma she underwent radical surgery the previous year, and the patient found this very burdensome. As well as this she was given hormone patches and medication containing Aprovel and CoAprovel. A year later an itching eruption came up all over her body and, because of that, the medication was changed early in January.
2010: on Amlodipin Hexal, plus Aprovel 300 with blood pressure 170/110; with medication blood pressure of 150/110 was measured.

In January 2010, when she had a bad cold, mild pain recurred in her left lower jaw, and this developed into a constant drawing sensation extending into the ear and the angle of the jaw; since that time she was constantly aware of it. Palpation in the region of lower left teeth 36 and 38 revealed pain on pressure.

On 8.3., surgical revision of these areas was undertaken, and additionally an augmentation (the bone was built up using Biogran®). As an adjunctive treatment ozone gas was administered, along with SANUVIS® tablets, 3 every 2 days, MU-COKEHL® 5X tablets once daily and Opsonat (Pekana Co.), one tsp. 3-6 times a day. Ten days later, when the sutures were removed, the patient reported that the symptoms were slowly improving. A histo-pathological tissue examination revealed cortical, spongy lamellar bone with “discrete changes taking place, and edematously loosened bone marrow rich in fat cells with discrete chronic inflammatory reaction”; with hindsight this confirmed our suspicion of “chronic, fatty maxillary osteitis”.

2. Clinical example of a case of chronic pain arising from dentogenous osteonecrosis. Mr. K.P.

Case history: Mr. P. had come to me for recurring pain (suspected trigeminal neuralgia) after 3½ years of unsuccessful treatment from his dentist, an ENT specialist, a University ENT department and a neurologist. He described his problem as follows: "Pain in the right half of my face, along the upper jaw, from the ear to the nasal septum. At times my right eye is also affected. The right side of my palate and the gum of the right upper jaw are irritated and sensitive to touch. These problems have been with me since November 2000 without a break, the only change is in the intensity."

The upper right 5 tooth (second pre-molar) had had endodontic treatment in 2003 (cf. Fig. 6).

In the TOPAS test the tooth gave readings of T 2 and PC. (In the TOPAS test a sample of gingival fluid is taken from the groove of the gum using a paper point, and this is checked using two laboratory reagents. From the colorimetric reaction it can be semi-quantitatively established (on a scale of T 0-5) whether a dead tooth constitutes a toxic burden, and to what extent inflammatory proteins are present (on a scale of P A-D). The pain syndrome present in Mr. P. had its origins in a pulp necrosis that had proceeded atypically, and this had resulted in chronic inflammation in the region of the right upper jaw. This had not died down even after root-canal treatment of the diseased tooth. The symptom picture was that of osteonecrosis, causing neuralgia and creating cavities, and this was difficult to detect by x-ray.

An intraosseous injection treatment was carried out, using Neural Therapy, isopathic and complex homeopathic remedies over the space of 23.7.04 - 12.1.05.

Treatment: On 23.7.2004 the patient was given a submucosal injection in the region of upper right 5, followed by a total of six Stabident injections (29.7.04, 27.8., 9.9., 26.10., 12.11., and 12.1.2005). On 12.11.2004 the patient indicated that the pain intensity had dropped to about 15-20% of the original level. In January 2005 the pain level had receded to c. 5-7% of the initial level - a satisfactory result, at least for the patient. For the time being there was no further remission. Since Mr. P. absolutely insisted on keeping the tooth, I

Fig. 6: Patient K.P., tooth 15: condition after root canal treatment 2003

Fig. 7: Patient K.P., tooth 15: condition after revision 2005
undertook a revision of the root canal treatment (c.f. Figs. 6 and 7). The root canal treatment of upper right 5 was concluded on 20.7.2005 (because of obliteration I had first carried out a depot-phoresis). On 23.4.2007 a fresh TOPAS test was carried out, resulting in readings of T1-2 and PA. This means that, as a result of the treatment, an improvement had been achieved regarding toxicity and inflammation parameters. As the residual problems remained unchanged, a further Stabident injection was given.

After that plans were made to crown the tooth and on 4.6.2007 this was completed. On 15.11.2008 a TAU examination showed only a very slight change. The upper right 5 tooth exhibited a pathological change mesial to the root apex, evaluated as second degree. Distal to upper right 5 the maxillary sinus could be seen, likewise at upper right 6 and 8 (see Fig. 8). The most recent follow-up examination took place on 13.11.2009; the patient’s state was unchanged.

Evaluation: This finding indicates that the upper right 5 tooth had a large abscess above the root apex. Second degree means, in any case, that bone with an inadequate blood supply is present, even if regeneration were to take place. From the prognostic point of view, we must consider that it will take several years for a necrosis to grow big enough to show up in a Cavitat™ result. With this in mind, it is advisable to carry out an annual check with Cavitat™, so that any deterioration may be spotted in time. In certain circumstances it may be possible to maintain the root-canal treated odonton in a functional state for longer.

Discussion

Experience shows that, as a rule, patients are reluctant to agree to surgical interventions. An objective and comprehensive clarification session regarding indications and risks of the possible alternative treatments is a precondition for acceptable consent. From the legal angle, a period of reflection is always recommended before a surgical intervention is performed. The necessity for effective, pre-operative pain-control is almost always given. My own experience shows that post-surgical complications can be overcome in the same way.

Conclusion 1

From over ten years’ practice with numerous cases of “intransigent” painful conditions I am able to report that an intraosseous injection that fits the indications constitutes an outstanding immediate intervention for the treatment of pain. Intraosseous injections should enjoy a much higher status in treatment to relieve health problems. It may be regarded as a safe procedure. It agrees with the principles of humoral-pathological treatment, as formulated by e.g. Reckeweg and, in the context of treating the milieu, it can achieve a reduction of the presenting toxic stress factors, particularly when combined with medicines produced by the SANUM-Kehlbeck Company. Any less-experienced therapist is recommended to use Neural Therapy medicines such as Procain and Lidocain, combined with the SANUM combined injections, as indicated by Bruno Träger. Thus, in a large number of indications, remission of the problems may reliably be achieved; however, this should not be confused with a
complete process of healing.

**Conclusion 2**

The great advantage of surgical removal of areas of chronically altered bone tissue in the jaw is the most extensive relief that this affords the patient. Often this is the long-term solution for which we strive.

**Conclusion 3**

TAU diagnosis using the Cavitat™ machine enables us to make a purposeful capture of data, on which we can base our treatment of osteonecrotic and ischemic areas of alveolar bone which frequently give rise to painful conditions. These however are attended by great difficulties in differential diagnosis, because precision is so elusive when using the customary methods (orthopan tomography, magnetic resonance tomography, computer tomography). Therefore TAU is also suitable for assessing the results of treatment after the implementation of surgical or minimally invasive procedures for cleansing dental interference fields.

**Appendix**

Composition of the SANUM combination injections (SMIs):

**SMI 1**

SANUVIS®
(2 ampoules)
NIGERSAN® 5X
PEFRAKEHL® 6X
MUCOKEHL® 5X
Traumeel (Heel)
(1 ampoule of each)

**SMI 2**

Instead of MUCOKEHL® 5X, NOTAKEHL® 5X is used. Otherwise, as for SMI 1.

Literature available from Semmelweis Verlag.

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