POPOVIC & KOLLEGEN

Praxis für Kieferorthopädie

Adult treatment

3. Jaw joint diagnostics and occlusal splint therapy

It hasn't yet been fully established how they develop. Fact is, up to now, a great number of possible causes for jaw joint (TMJ) problems have already been named.

A stressful job or every day life, impaired body balance and statics, poor body posture, a general predisposition to arthritis, hormonal dysregulation, side-effects of medications taken, or jaw malrelations. The spectrum truly is wide, and every day new possible causes are being found for TMJ problems.

The public has grown ever more aware of the TMJs. Patients research about them on the internet, physicians attend continuing education courses about this topic, and a variety of treatment modalities are being offered.

From an orthodontist's perspective, the key issue of TMJ problems is how both jaws interact and how the teeth interdigitate. The joints in the human body are very diverse and react quite differently to mechanical loads in the form of pressure or traction. The knee joint is "designed" to cope very well with these loads, if they are axially well-aligned. The range of movement is limited to ensure stability – a perfect adaptation to human walk. The TMJs, however, are "designed" to allow multiple movement directions, but this freedom "costs" stability: The TMJ, similar to the shoulders, is very sensitive to mechanical loads, particularly if they act permanently. A poor bite or a poor position of the lower jaw in relation to the upper jaw can cause the joint heads (which are part of the lower jaw) to be pushed back, i.e. in the direction of the ears, and into the joint sockets (which are part of the skull). And this is exactly where a cushion of very sensitive tissue is located (the bilaminar zone) that contains blood vessels and nerves, i.e. also those relating to balance and hearing. Consequently, it is not surprising that pressure on these nerves can lead to symptoms such as tinnitus (ringing in the ears) or dizziness. Pressure on the bilaminar zone may also decrease blood flow to the inner ear – which also causes these symptoms. Mechanical loads damage the cartilage between joint head and the socket (called disc). Normally, this disc prevents direct contact of bone on bone. Cartilage contains a lot of water. Massive pressure of up to 50 kgs and more literally pushes it forward and "squeezes" the disc like a sponge. This leaves it dry and sometimes even perforated or fractured. The TMJ most probably starts to click. This clicking sound usually originates with the disc, as it snaps back into its normal place during mouth opening. At some point, patients observe that TMJ clicking suddenly disappears. However, this is no reason to relax. In fact, when the TMJ suddenly stops to click when it has been clicking for some time, this usually means that the disc was squeezed too far forward: It cannot be recaptured during normal mouth opening. What it also might point at is that the disc doesn't snap back into place simply because there is no longer a disc. The cartilage has been resorbed. What this all means is: The disc has lost its function and no longer protects the bone. The joint surfaces scrape and grind against each other. The result is quite obviously permanent joint damage. Of the two possible explanations, disc resorption would have to be the grimmer one. While there is a small chance that a prolapsed disc (a disc pushed too far forward) can be recaptured (surgically or, perhaps even by non-invasive treatment), a non-existent disc leaves no choice. Depending on the stage of degeneration present, a more or less invasive surgical procedure will be necessary to address the problem and to ensure masticatory function.

Fortunately, all this may not have to come to pass if the underlying pathology – poor bite or poor jaw relation, tooth clenching or grinding, etc. – is diagnosed and treated in time. How to recognise possible threats before any damage occurs? Still, many people do not perceive TMJ clicking as a symptom. Often, they become aware of TMJ clicking only when asked about it. It is quite safe to assume that there is hardly anyone in whom TMJ clicking is completely absent, at all times. Consequently, it is easy to see why this symptom is not recognised as such, but as normal, and - in the end - ignored. Nevertheless, a frequently encountered symptom still remains… a symptom. Something ubiquitous is not necessarily normal. That is something to consider.

TMJ clicking is a warning that should be taken seriously to prevent future complaints such as TMJ arthritis, TMJ pains, tinnitus, hearing loss, or painful muscular tension. Once they are present, it is not always possible to guarantee complete elimination of these conditions; also, treatment involves much more effort. Initial stage symptoms are functional in nature. If ignored, they progress from functional to organic symptoms, reflected in alterations of anatomical structures... a great part of which are irreversible. Therefore it makes perfect sense to counteract the underlying pathology before it worsens from functional to organic.

As a result from our long experience, we subject every adult patient to a functional test of their masticatory system. The examination is usually called Manual Functional Analysis (MFA) or Manual Structural Analysis (MSA). Craniofacial musculature and joint structures can be assessed in great detail with a set of standardised tests. It often happens that already a preceding general susceptibility test reveals problems. Also, a joint provocation test can indicate that something may be wrong with the TMJs. The TMJ clicking we discussed or tension in certain chewing muscles can point the way for the clinician to diagnose further. Function – and sometimes anatomy already – has been affected. Clicking, as shown, proves that the disc does not sit where it is “supposed” to sit. To make an initial suspicion more concrete, to supplement the MFA/MSA results, and to plan optimal treatment, we usually request an MRI scan of the TMJs. MRI is a visual, three-dimensional and high-precision representation of TMJ anatomy and function. Bony structures and soft tissue can be viewed in their condition and exact anatomical relation to each other.

These in-depth examinations culminate in a verifiable and secure diagnosis and an individualised treatment plan. In cases with minimal functional disturbances of the masticatory apparatus, a special type of occlusal splint therapy can be successful. The splint is worn on the teeth and raises the bite a little. This helps the lower jaw glide into a more forward position without interferences. In some cases, the TMJs can be decompressed by this splint therapy alone. Difficult cases with malocclusions or jaw malrelations may require orthodontic correction. It is also feasible to combine both, splint therapy and orthodontics. The treatment sequence involves TMJ decompression with splints and then orthodontic tooth alignment to adjust the bite to the new position of the lower jaw.

In Europe, our practice has done a pioneer’s work in the prevention and therapy of TMJ problems. We have diagnosed and treated TMJ diseases successfully for over fifteen years. As to prevention, we generally intervene already at a very early stage by screening patients with potential predisposition for TMJ problems.