

Nutrition as a form of treatment

An essential part of conservative treatment



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For many years there have been repeated calls for a reappraisal of conservative treatment procedures in orthopaedics and trauma surgery. This includes, for example, the article in the *Sportärztezeitung* [Sports Doctors Newspaper] by Mr Manfred Neubert MD, in his capacity as President of the German Congress for Orthopaedics and Trauma Surgery (DKOU) 2016 (German Association of Orthopaedic Surgeons – BVOU), who recommended an approach of conservative treatment before surgery and emphasised that use of conservative treatment methods allows orthopaedic surgeons to alleviate pain, improve mobility and quality of life and curb disease progression successfully and at low risk (see Neubert: *Konservativ vor Operationen* [Conservative before Surgery], *Sportärztezeitung* 04/16, 24–25).

During the German Congress for Orthopaedics and Trauma Surgery (DKOU) 2016 it was established that the data on conservative treatment procedures in orthopaedics and trauma surgery in Germany have not yet been fully updated and that in Germany there is therefore a lack of evidence-based findings for the evaluation of conservative treatment. A white paper on conservative treatment is accordingly being prepared by the German Association of Orthopaedic Surgeons (BVOU) and learned associations. This includes pain therapy with shock waves, laser, injection therapy and acupuncture; physical medicine with thermotherapy, electrotherapy, hydrotherapy, cold therapy/cryotherapy and massage therapy; and equipment training, posture training, ergotherapy, back training and optimisation of training sequences as well as manual therapy and orthopaedic technology.

What is the place of nutrition?

In internal medicine, nutrition is provided as a conservative form of treatment for disorders such as obesity, diabetes, pancreatic diseases, skin disorders and intestinal disorders according to guidelines such as those of the AWMF (Association of the Scientific Medical Societies in Germany). Furthermore, in the new DGEM (German Society for Nutritional Medicine) guidelines on clinical nutrition published between 2013 and 2015 and replacing all earlier DGEM guidelines, clinical nutrition has its place in surgery and is listed as a therapeutic method. In top-class sports medicine and traumatology, however, study findings are often unknown and therefore inadequately implemented. There is therefore a need to also define nutrition more closely as a form of treatment and to structure investigation of its use.

“If a professional sports team plays only one fixture every week, then the players shouldn’t have any muscle injuries the entire season.”

Helge Riependorf, team doctor to AS Roma (21/02/2017)

Source: „Sportmedizin: Bundesliga hinkt hinterher“ – NDR.de

1.5 to 2 g protein per kg bodyweight are recommended in competitive sport. 20 to 25 g high-value protein after every exertion will increase utilisation and therefore result in more rapid regeneration. More recent studies recommend 40 g high-value protein for a whole body workout. A high percentage of essential amino acids also has a greater effect (whey protein) and a key anabolic role is attributed to a high leucine content. β -hydroxy- β -methylbutyrate (HMB) is a metabolite of leucine which accelerates muscle protein synthesis and, with prolonged intake, protects muscle mass when resting in bed. Moreover, protein can be given before bedtime to improve overnight regeneration and achieve a positive net balance.

2 to 2.5 g protein per kg bodyweight are now recommended for muscle injury. Creatine not only enhances performance but also has a positive effect on strength and mass loss in injury, immobility and rehabilitation training. Omega-3 fatty acids form important structural lipids in the body (fatty materials are used particularly in the building of cell membranes) and influence both muscle function and inflammatory and immune response by having a positive effect on the intracellular mTor signal pathway that regulates muscle protein synthesis. The inflammatory modulating effect in injury and wound healing is undisputed for intake of omega-6 and omega-3 fatty acids at a ratio of between 3:1 and 1:1.

“There is no football without pain-killers. Anyone who thinks that professional football can be played without the use of pain-killers is barking up the wrong tree. The demands that professional football players make on their bodies are simply too great.”

Niko Kovac, trainer with Eintracht Frankfurt in the BILD newspaper (02/03/2017)

Non-steroidal anti-rheumatics (NSARs) inhibit the two isoenzymes of cyclooxygenase, COX-1 and COX-2, and reduce protein utilisation, thus decreasing regeneration during training. They should therefore be used sparingly. Müller-Wohlfahrt and Ueblacker in 2010, however,



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recommend NSARs only in the first 2–3 days after injury. Enzymes have long been an essential component of adjuvant treatment for injury. Enzymes such as bromelain, derived from pineapple (but also contained in Wobenzym), act as immunomodulators, with an anti-metastatic, anti-oedematous, anti-thrombotic and anti-inflammatory action, have pain-relieving properties and accelerate the absorption of haematomas. Post-operative administration of bromelain reduces oedema formation in the operated limb and cuts down overall use of analgesics. Enzymes are accordingly an alternative to non-steroidal anti-inflammatory drugs (NSAIDs), as are, for example, aescin (Reparil) and homeopathic remedies (Traumeel).

Another important example is vitamin D, to which an increasing role is attributed, as vitamin D receptors are also found in muscle and do not only play a role in bone formation. In a study involving 723 patients who underwent orthopaedic surgery in Germany, it was shown that 43% had vitamin D deficiency. Low vitamin D levels have a negative effect on neuromuscular function. Bone marrow oedema, which is associated with vitamin D deficiency, is characterised by long periods of time off in athletes. Depending on the stage, treatment primarily involves conservative physiotherapy and drug and physical treatments, including even surgical stabilisation. In a retrospective study published by Ueblacker and Müller-Wohlfahrt in 2014, 25 top athletes with a mean age of 25 years (60% top European football players) were successfully treated for bone marrow oedema with high doses of vitamin D and intravenous bisphosphonates. The time between pain onset and diagnosis was 106 +/- 104 days. There was a clear recommendation for adequate daily intake of calcium and vitamin D as a preventative measure. A meta-analysis of 6 studies involving subjects aged between 18 and 40 years showed an increase in upper and lower limb muscle strength following supplementation. In a meta-analysis of 9 studies involving 2,634 soldiers, low vitamin D levels were shown to be associated with an increased incidence of lower limb stress fractures. 8% of players in a national football league team had deficient or inadequate vitamin D levels. Of 10 patients with a mean age of 59 years with transient bone mar-

row oedema of the foot, 9 had a vitamin D deficiency, 4 had osteoporosis and 5 osteopenia.

Vitamin D substitution results in a less pronounced increase in muscle damage markers due to injury. Measurement of vitamin D levels has long been recommended for stress fractures and bone marrow oedema. The investigations carried out by the author himself on players in the German first football division sometimes revealed marked deficits. Several studies have also demonstrated the effectiveness of vitamin D3 in treating both bacterial and viral infection due, for example, to the immunomodulatory action of vitamin D. The negative effect of vitamin D deficiency is even more pronounced in coloured sports people, a deficiency even more common.

“European comparisons indicate that investment in high performance teams tends to be lower in Germany than in any other country in Europe.”

Helge Riependorf, team doctor to AS Roma (21/02/2017)

Source: „Sportmedizin: Bundesliga hinkt hinterher“ – NDR.de

A further problem might well be the amount of support available to football teams from medical, physiotherapy, sports science and sports therapy experts. On 27 January 2017, Fredi Bobic, board representative for sport at Eintracht Frankfurt, stated in an interview with Hessen Radio (HR) that it is more cost-effective to invest in the team behind the football team if the money available to buy in new players is limited. However, this begs the question not only as to how much is invested but also as to who as a

INFOBOX | Enzyme therapy – an effective alternative to NSARs

A recent meta-analysis shows that a combination enzyme product (Wobenzym plus) is of a comparable efficacy but superior in terms of safety and tolerability to NSARs in patients with osteoarthritis of the knee. There are reports that enzyme products have also proven effective in treating sport injuries such as sprains, contusions and compression injuries. For more information about the meta-analysis and the results, email info@thesportgroup.de.

board member or Head of Sport has the expertise to assess quality in this area. The question must also be asked what status and expertise the future trainer, in this case in football, would like to have established and helps to develop in this area, instead of the team – in the worst-case scenario – going backwards.

“We showed that players in German teams take more time off due to injury than their counterparts in Italy, Spain or England.”

Helge Riependorf on his study,

Source: „Sportmedizin: Bundesliga hinkt hinterher“ – NDR.de

Helge Riependorf, who as well as being team doctor to AS Roma is also the Medical Director of Sports Medicine and Prevention at the hospital in Hamburg-Boberg, is especially critical of the staffing of medical departments in many German football clubs. Whereas elsewhere there are two to three full-time doctors looking after the professional football players, in the German Bundesliga there is, bar a few exceptions, only one – who is only occasionally at the club and usually also has his own practice to run. The doctor, as health coach and support for the players, should therefore be in attendance for training and treatment as often as possible. Should an orthopaedic surgeon not be able to cover all that is required, which is more likely than not these days, then the specialist in internal medicine or the nutrition counsellor should assume these duties at the club when the players are training and playing.

Opportunities are lost unless nutrition, monitoring, readily available care, adequate preparation and enquiries from players and training staff remain points of focus. Riependorf therefore also calls for monitoring in person and the mandatory attendance of the team’s medical department at every training session.

It is recommended that changes not only be identified simply by weighing players but also by performing body analyses to determine nutritional state and quantitatively assess water, body fat and muscle mass. It is for good reason that people talk about a person’s or sports person’s resilience, meaning a stability underlying their health, performance and, for example, their lack of susceptibility to infection. Conventional BIA (bioimpedance analysis) allows detection of water shifts, such as occur in injury and infection. This is standard in many clubs in Italy, as Dr Paolo Manetti MD, team doctor to AC Florence, confirmed in the workshop and symposium “Regeneration & Muscle Injury” held by the sportgroup GmbH in the Mercedes Benz Arena in Stuttgart on 8 October 2016 (see Fig. Manetti). The more recent direct segmental multi-frequency method shows, via the differing distribution of muscle in the limbs, whether the person is right or left-handed or footed (football) or an injury (shoulder) has not been appropriately treated. These measuring systems are now so advanced that the body composition results meet the gold standard DEXA (dual energy x-ray absorption)

Dott. Paolo Manetti, Team doctor to AC Florence at the workshop and symposium “Regeneration & Muscle Injury” held by thesportgroup GmbH in the Mercedes Benz Arena in Stuttgart on 8 October 2016.



by over 98%. Segmental fluid shifts are now also detectable in individual muscles, allowing assessment of regenerative progress after injury, as studied and demonstrated from 2012 to 2014 in 21 FC Barcelona players with muscle injury. Consequences for training content can also be analysed (see INFOBOX II).

Conclusion and prospects

Nowadays, there should also be an appropriate focus on nutrition in every form of treatment. Physiotherapy, stabilisation exercises, stretching, Blackroll®, fascia training and yoga form not only treatment but are also an integral part of training and as such also require help with nutrition. During treatment, nutrition should be checked using established measuring systems such as laboratory tests and body analyses.

A sideways look from the editors

Less chocolate, more sport for the Citizens!

Pep Guardiola is a total perfectionist – and this is reflected in his players' diet too. Samir Nasri, for example, was once put on a diet because he was judged to be overweight, and the same applies in general at Manchester City – players who are overweight are not allowed to train with the team. Pizza and the like are banned from the menu; instead, players have a choice of fish, quinoa, pasta, salad, rice and chicken. But the coach is now going one step further with his diet programme. According to reports across the British media, all confectionery will soon be banned from sale anywhere on the Citizens' training ground – in other words, the staff at Manchester City will be affected too. According to the Daily Mirror, Guardiola's nutritionist Silvia Tremoleda has now begun to design healthy meals for the entire Manchester City staff. The staff already benefit from free membership in fitness clubs!

Source: www.n-tv.de (23/03/2017)

INFOBOX II

Other possible applications of BIA in training – an example from triathlon

A top female triathlete presented with a qualitatively marked muscle difference between one leg and the other. It was clear that there was an imbalance in the force exerted by each leg, e.g. when cycling. The subsequent test showed 46% to 54% distribution of force onto the pedals. Such differences may, of course, cause back problems (blockades) and result in changes in the muscle chain.

Every conservative treatment form, including immobilisation, results in the activation or stimulation of cell processes and a need for adequate vitamin, mineral and protein intake to ensure optimum treatment success. This applies to the sports person and therefore also to the patient. Take shock wave therapy as an example, which induces an increase in a variety of human cell culture lines (mesenchymal stem cells (hMSCs), chondrocytes and tenocytes) and leads to the new formation of extracellular matrix via fibroblast activation. Changes in the activity of osteoblasts induces bone healing. In tenocytes, gene expression increases collagen production. In tendons, there is an increase in lubricin, a glycoprotein that enhances sliding capabilities in joints and fascia. Vasodilation results in a decrease in inflammatory substances and an increase in vascular endothelial growth factor (VEGF), thus promoting angiogenesis. This requires, of course, a 25 g intake of mineral-rich fluids and protein, such as after a training session. Enzymes should also be administered and vitamin D levels checked. A rapid test with a mobile reader is now being developed for this purpose. With neuromuscular electrical stimulation (NMES), which is now applied as EMS (electrical muscle stimulation) whole body training, it has been shown that single use stimulates protein synthesis for at least four hours in elderly male patients and significantly reduces loss of muscle mass and strength in immobilised limbs and coma patients. The authors wish to offer for discussion the positive effects achieved with nutrition in most cases and refer even to the sometimes inadequate diet provided by hospitals.

