

REFLEX

THE KIESER TRAINING MAGAZINE

59



MUSCLES THAT YOU CAN HEAR

WHEN NORBERT GÖLLER FLEXES HIS MUSCLES, THE SOUND IS FANTASTIC

NORBERT GÖLLER IS A CLARINETIST WITH THE NEUE WESTFALEN PHILHARMONIE ORCHESTRA IN RECKLINGHAUSEN, GERMANY. SINCE 2004 HE HAS BEEN KEEPING HIS MUSCLES FIT WITH KIESER TRAINING SO THAT AUDIENCES CAN ENJOY SUBLIME MUSIC.

Mr Göller: You perform 100–120 operas and symphony concerts every year. That sounds extremely strenuous. If you rehearse and perform for hours on end mornings and evenings and add to that your personal practice, you can easily end up creating music for eight or nine hours every day. The pressure is often immense and it is very tiring. You need to be in good shape to play music at such a high level.

Can you hear the difference?

You notice it immediately. Music is a brutal profession; as soon as a muscle starts to tense up, the quality of the sound is reduced. In extreme cases, individual fingers fail to work properly and the sequence of tones is slightly – or even very inaccurate. Colleagues notice it immediately as do a musically educated audience. A relaxed body and mind are essential. Kieser Training gives me what I need: a healthy, strong and resilient body and a stable mind.

Why do you as a musician need strong muscles?

A healthy mind in a healthy body: I feel much better if my body is in good shape, if I am mentally fit and psychologically on an even keel. The clarinet is a wind instrument and you breathe into the instrument to create the sound. This process starts in the core – in your diaphragm and so you need to keep an upright posture for several hours at a time. In addition you must remain constantly alert and focussed. It's energy sapping and can



only be sustained if the body has the required stability and you can rely on your muscles to work – in complete harmony. Training with Kieser has really helped.

And what about the mind?

Emotions and feelings are essential qualities for musicians. The mental stress is relatively high. Many of my colleagues are often working at their limit and so see things in a more negative light than they actually are; they feel exhausted and are quick to take offence. Kieser Training is a great help. If I feel like that, training puts the world to rights. It acts as a fountain of youth for me and I feel more positive when I leave.

In February, for example we had two concerts in Ludwigshafen. I slept badly in the hotel and felt really bad. So, I drove to the Kieser Training studio in Mannheim. One hour later, my mood had improved and I was looking forward to the concert that evening. It is at those moments that I feel that life is good.

That sounds as though you have achieved your training goals ...

When I was younger, I suffered regularly from tension, cramp and the effects of poor posture. Regular Kieser Training has significantly improved the stability of my body as well as my mobility.

All in all, I find it easier to deal with the stresses and strains inherent in concert performances. My concentration is better and I am more focussed. When colleagues start complaining during a performance that their shoulders are tense and they can't wait for the interval, I still feel fine. Last and not least, I am much better at sport than I was.

Read the full interview at:
kieser-training.de ■

Name: Norbert Göller
Age: 53
Profession: Clarinetist with the Neue Westfalen Philharmonie Orchestra Recklinghausen, customer since 2004
Studio: Recklinghausen, customer since 2004

FOUNTAIN OF YOUTH FOR OUR MUSCLES

SATELLITE CELLS

ALTHOUGH ADULT MUSCLE CELLS CANNOT DIVIDE OR MULTIPLY, THEY CAN – THANKS TO SATELLITE CELLS – REGENERATE AND GROW.

Satellite cells are muscle stem cells, i.e. not yet fully developed. In contrast to adult muscle fibres, satellite cells are able to divide when activated. Their name comes from their location; like satellites they are, so to speak, in the orbit of muscle fibres.

“Satellite cells play an essential role in the regeneration and growth of muscle fibres,” says Dr sc. ETH David Aguayo from the Kieser Training Research Department. Normally, muscle stem cells remain quiescent beneath the basal lamina but can be activated by a range of stimuli such as physical activity.” They then start to multiply. Subsequently, they either

return to their quiescent state, i.e. they fill up the reservoir of stem cells or they develop further to be incorporated into existing muscle fibres.

For muscles to grow, the body must have sufficient cell nuclei because these nuclei are packed with deoxyribonucleic acid (DNA), the blueprint for new muscle protein.

During muscle protein synthesis, the information stored in DNA is transmitted to messenger ribonucleic acid, mRNA for short. Copies of this genetic blueprint are transported to the

Satellite cells are essential for muscle fibre repair

ribosomes in muscle cells where they are translated into a sequence of amino acids. As a result, a specific muscle protein is produced and incorporated into the fibres, making them thicker, longer and stronger.

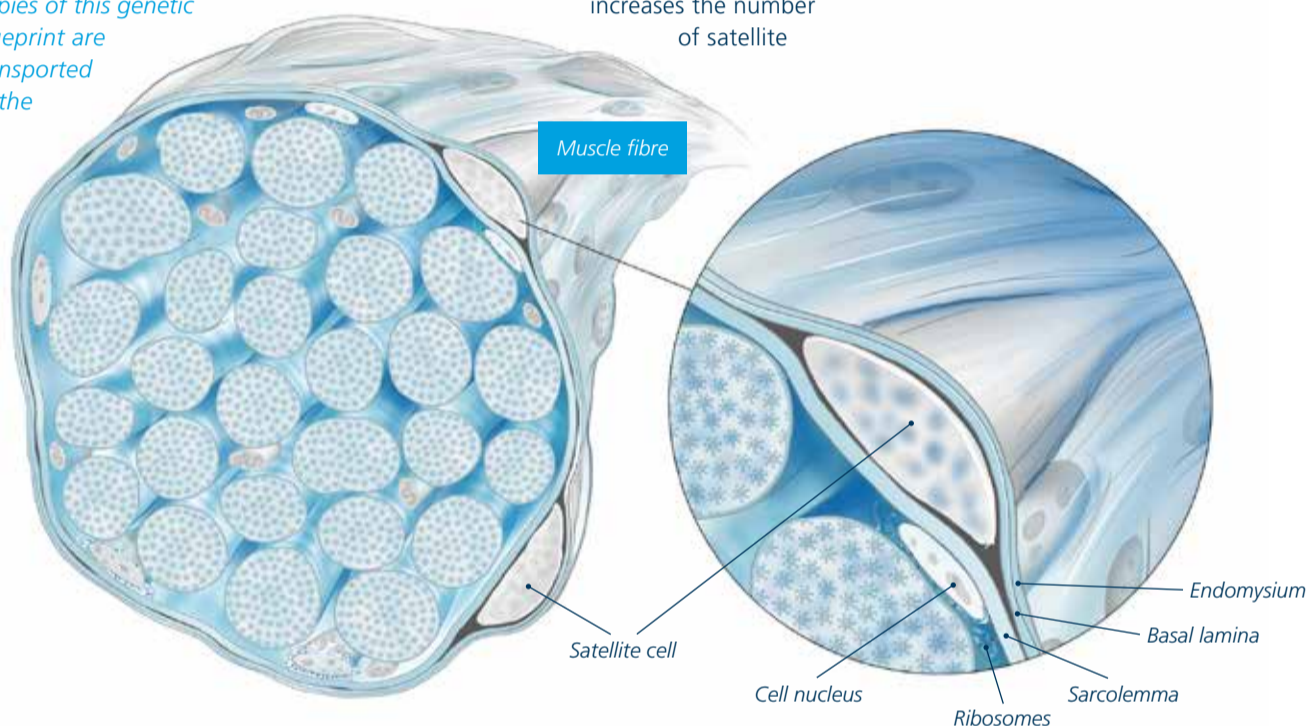
Extensive muscle growth, e.g. during adolescence is accompanied by an increase in the number of cell nuclei,” says Aguayo. This is because the nuclei already present in a fibre can only supply DNA to a given area. Above a certain level of muscle growth, build-up can only continue if new cell nuclei are added. Regular physical activity increases the number of satellite

cells, making them essential for the development of muscle mass and for retaining it as we get older,” stresses Aguayo.

No regeneration without satellite cells

If a muscle fibre is damaged, this can result in the loss of cell nuclei and with it the DNA content. The absence of satellite cells reduces the ability of muscle fibres to repair themselves. Scientists are agreed that ongoing, regular strength training increases the number of satellite cells. “It is assumed that the training retains or even improves the potential of skeletal muscle to regenerate.” ■

Satellite cells are muscle stem cells located between the cell wall and the basal lamina and seem to be extremely important for the retention and development of muscle mass.



WAKE UP YOUR SATELLITE CELLS

STRENGTH TRAINING ACTIVATES MUSCLE STEM CELLS



SATELLITE CELLS IN ADULT SKELETAL MUSCLE REPRESENT AN IMPORTANT RESERVOIR FOR REGENERATION AND GROWTH. THE NUMBER OF SUCH CELLS DEPENDS ON VARIOUS FACTORS SUCH AS AGE AND LEVEL OF TRAINING.

The muscle fibres of younger people contain more satellite cells than those of older people. With increasing age, this reservoir of muscle stem cells declines and with it the ability of the muscle to regenerate and grow.

Well-trained muscles also have more satellite cells than untrained muscles. In other words, train correctly and regularly and you can activate your satellite cells and ensure that new cells are formed. The reservoir available for regeneration and growth is greater.

So, wake up your satellite cells now!

How to do it

Strength training activates the satellite cells of our muscle fibres and so increases the number of cell nuclei and DNA content. In the final analysis, this increases the rate of muscle build-up. There are still some things that are not fully understood but we do know that if you train to local fatigue in 60–120 seconds, this triggers a training stimulus that increases muscle protein synthesis.

We also know that the negative phase of the exercise – also known as eccentric or more recently the plyometric phase – is particularly good at activating satellite cells. ■

LATEST RESEARCH:

FEELING TIRED? STRENGTH TRAINING RE-ENERGISES AND BOOSTS PSYCHE

THE COMBINATION OF JOB, FAMILY AND LEISURE PUTS CONSIDERABLE DEMANDS ON MOST OF US AND FOR SOME, THE DEMANDS ARE EXCESSIVE; WE OFTEN FEEL WASHED OUT, SLEEP BADLY, ARE ANXIOUS OR EVEN DEPRESSED. RECENT RESEARCH HAS SHOWN THAT STRENGTH TRAINING CAN HELP.

The list of the positive effects of strength training is long – and is getting longer all the time: It strengthens muscles, bones, ligaments and tendons; it improves performance and helps prevent illness and injuries; it even improves our metabolism and heart. And what about the human psyche? Recent studies have shown that what sounds too good to be true is actually true.

Until now, there has been little research into the psychological effects of strength training. In fact, only some 10% of published literature in the field of sports science deals with the issue. Too little you may think if you bear in mind that psychological problems are increasingly the reason why employees take sick leave. Fortunately, researchers are an inquisitive bunch and have begun to pay more attention to the effects of strength training on mental health.

One of them is Dr Patrick J. O' Connor from the University of Georgia in Athens, USA. "We simply don't know enough. More research is needed," says the scientist. He is interested in various aspects of mental health and has looked for example at the effect of strength training on energy levels, anxiety and depression as well as cognitive function.

Energy

"Everybody wants more energy, to be more productive, learn more and more quickly. Unfortunately, many of us are just too tired." O'Connor's comment is not just a subjective assessment based, for example on looking at those in his immediate environment. Rather, it is based on extensive analyses in 2010.

Some 17,000 people in Western industrialised nations were asked the following question: Have you felt tired in the last week? 30% of respondents said "yes". The analysis showed that women were more likely to be tired than men and – not surprisingly – the percentage was higher amongst those with an illness or medical condition compared with the healthy cohort. Particularly interesting was the fact that the physically inactive were more likely to be tired than the physically active.

In other words, physical activity and strength training are an easy way to combat tiredness and rouse us from our lethargy. If you already train, you



Strength training instead of coffee!

Do you feel tired? Or did you train today? It is now known that strength training is an effective antidote to a tired mind.

won't be surprised by this news: Even if your muscles initially feel shaky, you soon feel full of energy, full of vigour and feel ready to tackle anything. Recent research has now established this link. "After a single bout of strength training, people simply have more energy."

Lack of strength has a cost

Strength training is not only beneficial to those who do it but it also helps to tackle the huge cost to society caused by severe fatigue", says O'Connor. Globally, the annual cost is about US\$500 billion: of which 40 billion relates to healthcare, 108 billion to accidents caused by fatigue and 360 billion to lost productivity at work.

"It is not only tiredness that has a cost. Both anxiety and depression have an associated cost," stresses the US researcher. "This means that if physical activity and strength training were used to improve mental health, we would not only help those involved but boost our economies as well."

Anxiety

Recent research has shown that strength training also scores well in terms of anxiety: "Even a single bout of strength training done at moderate intensity can reduce levels of anxiety. The greatest effect seems to be on those with a generalised anxiety disorder.

Depression

What about depression? Can strength training help? The answer is "yes", says the researcher – even if the benefits are less than might be expected – at least based on existing research. Nevertheless, moderate strength training 2–3 times per week can alleviate depression symptoms, e.g. in cardiac or cancer patients.

Sleep

There is a further important aspect: Our mental health is heavily dependent upon the quality of our sleep. As O'Connor explains: "People who

sleep badly often develop mental health problems and vice versa those with mental health problems often sleep badly. The two are closely linked."

Cognitive function

Last but not least, strength training has a positive effect on cognitive function. "If older people train regularly, they can help improve certain aspects of their cognitive function," says O'Connor. The ancient Romans knew what they were talking about when they said. "Mens sana in corpore sano" – strong body, strong mind.

KIESER CUSTOMERS SLEEP BETTER

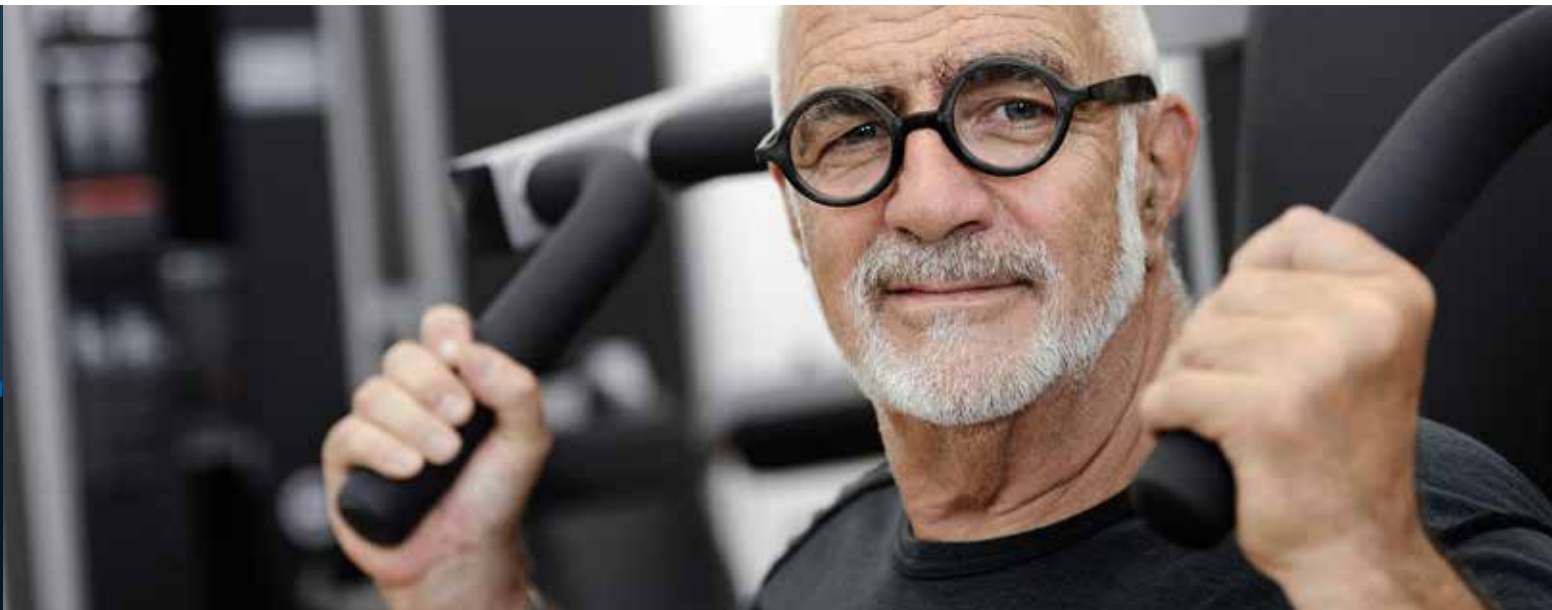
A study by Kieser Training monitored by five external and independent scientists demonstrated the positive effect on our mental health: 500 participants trained for 6 months at Kieser Training studios throughout Germany.

Results:

- 82% of participants said that the training provided a good balance to their daily life.
- More than 50% reduced stress levels.
- 30% of participants who trained slept better thanks to the training.
- 65% felt they were more productive at work.
- 89% felt physically fitter.

Strength training is a simple and effective way to combat tiredness, anxiety and depression and reduce the annual cost to society. ■

Watch Patrick O'Connor on youtube: <http://bit.ly/1TOSLWQ>



When I was younger, I had little time for food supplements. After all I ate a balanced diet that included animal products, fruit and vegetables, which provided me with what I needed. However, we don't remain young for ever. When I reached 50, I started to wonder why I was finding it more difficult to achieve what I had in the past. Everything seemed slightly but noticeably more difficult.

My eyes were opened when I read an article by Professor Theo A. Wallimann, who during extensive basic research at the Institute of Cell Biology at ETH Zurich had recognised the importance of creatine for the energy metabolism of cells. Creatine is a natural substance found in the body and the body itself produces about 50% of its daily requirement (in the kidneys, pancreas

and liver). The remaining 50% has to come from eating meat or fish. The creatine ingested in our diet passes through the intestine into the blood stream and from there – as does the body's own creatine – into all cells. Creatine is essential for the normal function of body cells, including the muscle cells.

Primary function of creatine
For muscles to produce strength they need energy in the form of adenosine triphosphate – ATP for short. Chemical energy is released when one of the phosphate molecules splits off from the ATP to become low-energy adenosine diphosphate (ADP). Creatine then combines with this single phosphate molecule to form energy-charged phosphocreatine; it acts as an energy

buffer as the body can only store limited quantities of ATP and only for limited periods. If a cell is activated and needs energy, e.g. during strength training, the phosphocreatine transfers the phosphate molecule back to the energy-poor ADP so increasing the amount of energy-rich ATP available for use.

As we get older, our body produces less creatine and so a supplement can make sense. Studies of adults over 55 years of age have found that a minimum of three grams per day combined with regular, moderate strength training three days per week has a positive effect on muscle strength. I tested the theory myself using "Kre-Mag", a product that also contains magnesium. Lo and behold, my performance returned to its "old"

level. My first thought was that this was down to the placebo effect and so I stopped taking the supplement. After a few days my performance declined. My next thought was that the product could be a drug. However, the European Food Safety Authority classifies creatine as a natural food supplement and recognises the health benefits.

I should hasten to add that I do not sell creatine nor do I have an interest in any company that distributes it. Based on the data currently available and my personal experience I am, however, convinced that it works.

Werner Kieser

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FOR MUSCLE BUILD-UP YOU NEED PROTEIN

FOR A LONG TIME, PROTEIN WAS SCORNE. HOWEVER, IF YOU WANT TO DEVELOP MUSCLE, PROTEIN IS ESSENTIAL. BUT HOW MUCH DO YOU ACTUALLY NEED?

Do we consume enough protein? Dr Marco Toigo has looked into this question as part of his university research. Food companies have traditionally said that you need 0.8 grams of protein per kilogram of body fat per day.

However, is this really enough?

"The current recommendation takes no account of age, gender or the level of physical activity. In addition, it ignores aspects such as the quality of protein," says Dr Marco Toigo.

Recent research has suggested that the amount of protein required by different age groups has been clearly underestimated. "Based on current data and if we want to achieve the optimum health benefits,

it would be better to recommend 1.5–2.2 grams of protein per kilogram of body mass. This is two to three times the current recommendation for daily protein intake. For example, for somebody weighing 80 kg, the latest recommendation would mean some 176 grams of high-quality protein per day and a minimum of some 96 grams. ■



Tips from Dr Marco Toigo

- Take in enough dietary protein, i.e. 1.5–2.2 grams of protein per kilogram of body mass and each time you consume food the recommended amount is 20–30 grams of protein. For senior citizens, it can be slightly more: 0.6 gram per kilogram of lean body mass and per intake. That equates to 30–40 grams of protein per intake.
- When eating composite meals, simply ensure that each meal contains at least this quantity of protein.
- It is useful to spread your daily protein requirement between several portions, each of 20–30 grams and to consume one portion every 3–5 hours.
- Ideally, consume one portion immediately after strength training.

We want satisfied customers convinced that training works. Help us improve our service by taking part in our anonymous survey of customer satisfaction at survey.kieser-training.com