Do not use bisphosphonates without scientific evidence, neither in treatment nor prophylactic, in the treatment of stress fractures

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Stress fractures are common in athletes and can end the career because of its long time for healing [1, 2, 4, 5, 14]. In military recruits, especially in basic training, it has led to modification of the type of training, the time for the repetitions and the load [9, 10]. The researchers are trying hard to get a solution to the problem, not only with different types of surgery but also by medical treatment [4, 11].

Bisphosphonates have been used for several years to treat osteoporosis by its function to increase bone mass and decrease fracture risk as the osteoclast activity depresses [8].

It is a potent drug, used in the treatment of severe diseases like Paget's disease, bone tumors and metastases.

A stress fracture is an overuse injury and the mechanism depends on the load of the bone and if the load gives more strain and strain rate than the bone can stand, then a stress fracture occur [10].

Animal model experiments have suggested that suppression of bone remodeling can prevent stress fractures [2, 3, 8].

There are contradictive signals whether it is possible or not to detect any biochemical markers in the blood of recruits or athletes with increased bone remodeling as a sign for stress fracture [1].

The effect of bisphosphonates on fracture healing has also been discussed, though they suppress bone remodeling—some researchers have reported larger callus and delayed maturation of the fracture in animal models and some other report no problem with fracture callus

remodeling unless very high doses of bisphosphonates are used [7, 8].

On the contrary, other reports propose that bisphosphonates may enhance fracture repair, probably by stabilizing the fracture callus. Others include the improved osseointegration of metal implants in treated ovariectomized rats, or improved distraction osteogenesis, conserving bone architecture after osteonecrosis [6].

Bisphosphonates are known to reduce pain in different bone conditions as osteolytic metastasis, multiple myeloma, and localized transient osteoporosis [15].

A report of one female runner with LTO of the navicular bone, treated with bisphosphonates—were pain—free after few days and then she had a complete resolution of the oedema in the tarsal navicular. This is though only one case [12].

In fatigue loading, no studies using bisphosphonates have proven any effect, but conclusions are that longer treatment than 2 weeks are needed to get effect on fatigue, and a combination of glucocorticoid and alendronate in mice, lowered the apoptotic effect of bisphosphonates on osteoclasts.

The half-life of bisphosphonates in bone is very long—1 to 10 years, and depends on the rate of bone remodeling, it is also suggested that bisphosphonates buried in the bone, is inactive, at least as long as it is sequestered there. Alendronate has been shown to inhibit normal microdamage repair that arises from a marked suppression of bone remodeling, which in turn results in accumulation of microdamage. The doses were much higher than those to treat human osteoporosis [13].

Some studies shows that long-term use of bisphosphonates for osteoporosis therapy appears to be safe, however, there are studies that reveal deficiencies in bone formation, and some studies suggest that bisphosphonates treatment

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might impair mechanical bone strength, and that long-term suppression of bone remodeling by bisphosphonates could result in brittle bones [7, 13].

The most common short-term side effects of bisphosphonates are nausea, fatigue, arthralgias and myalgias, it can also lead to stomach upset, inflammation and erosions in the oesophagus—which is the main problem. Another, not very common side-effect is osteonecrosis of the jaw, especially in patients with multiple myeloma or metastatic cancer, treated with intravenous bisphosphonates [17].

There is only one randomized controlled study made, concerning the prevention of stress fractures using oral bisphosphonates, and there were no difference between the study group and the control group [11].

In their conclusion, the writers of the paper wants to exclude pregnant women and young athletes—because of open physis—from being treated with bisphosphonates, hence we do not know the effects in the long run.

I want to go further—all people treated up to date, with bisphosphonates, are suffering of a disease in one or another way. Of course it is important to treat those as well as we can. In that case we have nothing to lose, and we can afore some side effects, sometimes even a lot of side effects.

An athlete or a military recruit is a healthy human and has got an overuse injury. We know that if these guys rest for some weeks—the stress fracture will heal.

When it comes to tibia stress fractures—most common in athletes—it takes about 12 months in “active rest” to heal. It takes about 6 months if they are operated on.

Other mechanical treatment, like shock wave therapy or ultra sound therapy can also be helpful in treating stress fractures [16].

Until we know more about the bisphosphonates—they would not be used in the treatment of stress fractures in athletes or militaries.

Most important is to learn more about the mechanism around stress fractures—extrinsic and intrinsic factors, the bone biology and the biomechanical factors and to help the athletes and military recruits to get right training programs, that to prevent them from getting stress fractures.

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