Effect of mandibular bite plane appliance on power performance in cyclist athletes

Disco
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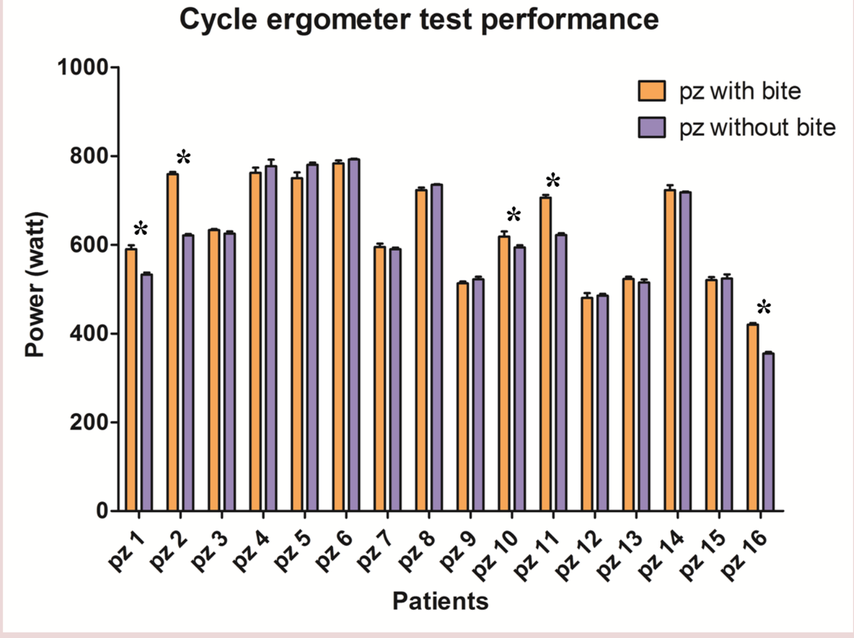
Objectives: the use of bites or any other occlusal device correlated to athletes is object of discussion about the possible efficacy in improving physical attitudes. In this study, an experimental path has been set, with the final goal of evaluating the real interaction between occlusion, posture and muscular balance, and so physical performances' increase in athletes.

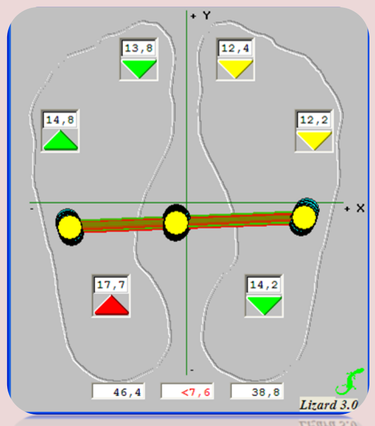
Materials and Methods: the Spintrainer® is a device that allows to simulate a bicycle speed, as real as possible. In this case the power (expressed in watt) has been considered. The device has been calibrated for each bicycle and therefore for each athlete. Calibration allows to uniform power values and the correspondences power/hearth frequency/speed, beyond the bicycle used or Spintrainer's mechanical conditions (e.g. subject's weight, friction of moving parts increase/decrease: fly wheel, cylinder of support, alternator, central axle). Beyond the Sprintrainer®, also athletes 'own bicycle, meter of cardiac frequency and a bite performed to have uniform centric contacts have been used.
Global body balance has been evaluate using a static posturography. The test of balance or static posturography is a simple, up-to-date and quick method under static conditions the center of gravity. We have used a static platform lizard®, so the general stabilogram with analysis of the minimum, medium and maximum X and Y; ball area, speed, length and speed variation. After a close clinical evaluation on athletes' gnatologic situation and their static and dynamic occlusion (15 athletes, 12 males and 3 females between 21 and 55 years old).

Results: 16 subjects, 12 male and 4 female, met inclusion. 7 subjects (43.75% of total) had an incorrect dynamic occlusion. All patients showed a change of performance during the cycle ergometer test, but without reaching statistical significance ($p > 0.05$). On the contrary, 5 patients (31.25% of total) showed a statistically significant ($p < 0.05$) increase in performance as a result of the use of the splint bite during the cycle ergometer test of maximal power. Interestingly, all the five patients belonged to the group of the incorrect dynamic occlusion.

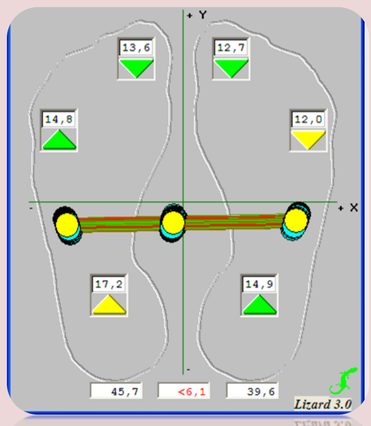


Discussion: The results of the present study failed to demonstrate improved strength or performance while using a customized oral functionalized mandibular bite plane, in accordance with previously reported research.
5 subjects improved their performance in statistically significant manner. Indeed, effect of mandibular orthopedic repositioning appliances on the increased athletic performance like muscular strength has been reported also in other previous studies. However, in our series athletes that improved their performances had occlusal problems that were corrected with mandibular repositioning. In accordance with previous study, it was herein suggested that use of oral appliance may be beneficial only in those subjects with occlusion problems. Human postures are determined and maintained by the coordinated movements of muscles, proprioceptive senses, the sense of equilibrium, and the positions and functions of joints.

Without Bite



With Bite



In present series, subjects who improved their performance may have been did so by improved postural balance. Indeed, present results showed how all subjects that improved their performance beneficiated a postural balance wearing the bite.
Within the limitations of this study, it can be concluded that occlusal repositioning using bite plane may improve a cyclist's power during sprint only if they had occlusal problems.

Di chi sara' il mondo di domani?
Di chi oggi canta in coro.

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IL Di.S.C.O. SI RACCONTA