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The *Speaker* at the conference will be Julien Paulus

PRESENTATION PREFERENCE **ORAL** ☑ *(please tick)* **POSTER** ☐ *(please tick)* **CONTEST** ☑ *(please tick)* ***Best Case Report Award***

TRAINING LOAD MANAGEMENT: EFFECTS ON INJURY PREVALENCE IN HIGH LEVEL RUGBY CENTER

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Introduction : According to some theoretical integrative models, fatigue is considered as harmful for the ability to perform (fitness-fatigue) while in other ones it is complementary to it, or even a precursor. Whatever the paradigm, the injuries, possibly except those resulting from collisions, can be considered as an inadequacy, acute or chronic, between stimuli and sportsman's (recovery) capacities.
The objective of this study was to measure the effects of using a decision-making tool based on a daily, dematerialized but centralized, quantification of training load on the occurrence of players' injuries in a rugby-training center.

Methods : Each training session is characterized by a Workload Index (WI) with a scale ranging from one to five units. When the cumulative sum of the WI of a player exceeds a semi-individualized threshold, he enters in a recovery phase (reduction in training and addition of hydrotherapy sessions).
The 35 players integrated into the Training Center are selected from the best Belgian rugby players of their age category (16.3 ± 1.1 years / 81.1 ± 18.3kg / 176.7 ± 5.6 cm for Y-1 season; 16.4 ± 1.1 years / 83.7 ± 15.1kg / 179.8 ± 6.5 cm for Y season).
Each lesion resulting in medical consultation or practice restriction is considered an injury.

Results : Competitive data of the Training Center players are slightly higher in the second season analyzed: the total playing time, the number of matches played and the average playing time per game increased by respectively 17%, 11% and 5% (non-significant).

A sharp and significant decrease (74%) in the number of match injuries was observed between the two seasons. The season prior to the use of the decision-making tool, the Training Center players were injured during games, on average, 1.9 times per season against 0.5 during the Y season.
Whether during the first or second competitive block, the number of match injuries is lower during the Y season. The correlation between the number of match injuries and playing time is respectively (very) strong and moderate for Y-1 and Y seasons: 0.899 [0.620 / 0.976] (p <0.001) and 0.617 [-0.020 / 0.900] (p = 0.051).

	Y-1 season	*Y season*
Total playing time (minutes)	27 873	32 480
Games	488	542
Injuries	68	18
Players injured during season	71%	31%

Table 1: epidemiological data

Conclusions : To our knowledge, this study is the first to evaluate, with an experimental research model, the effects of quantifying training load on the prevalence of match injuries over a significant number of rugby elites players. Our results show that during the Y season, following the introduction of the quantification of the training load, the players played more and were injured 4.5 times less in a match than during the previous season.
We can not exclude that confounding variables might have influenced these results, nevertheless, they are unable to explain the drastic reduction in the number of injuries. A retrospective analysis revealed that (1) during the Y-1 season, players had periods of relative rest while the cumulative training load did not necessarily require it which could possibly have led to an under-training status [3], increasing the risk of injury [1] ; (2) at the opposite, the players could, during the Y-1 season, exceed the maximum workload threshold that we would have defined, in Y season, for these same players [2].
In the Y-1 season, 81% of the variance in match injuries was explained by the variance of playing time while in Y season, this percentage dropped to 38%. Before the introduction of training load quantification, the playing time appeared to be the main cause of the number of match injuries. Indeed, an increase in playing time seemed to lead to an increase in the number of match injuries suffered by players. During Y season, an increase in competitive playing time no longer seemed to increase the number of match injuries so directly. That could explain the increase in the number of games played per player (+1.6 games per season) and the playing time per game (+3 minutes per game). The reduction in player unavailability has resulted in an increase in the number of hours of deliberate practice, match and training situation, which is itself beneficial in the player's training process.
The respect of training optimization principles through the individualization of relative rest periods has therefore resulted (1) in a very significant reduction in the number of injuries during Y season and (2) in a primary prevention action, so needed.

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