

# Cognitive impairments in community-level rugby players in Nuevo Leon, Mexico

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## Background

Rugby is a sport that involves numerous collisions and tackles. It has a high reported incidence of concussion and other traumatic brain injuries which are believed to cause serious consequences in short and long term, damaging neurocognitive abilities and altering the ability to regulate emotions (1).

## Aim

To identify the cognitive profile of community-level rugby players in Nuevo León, Mexico, and its association with demographic and clinical history.

## Methodology

We selected information from the baseline assessment of 5 teams of community-level rugby in Nuevo León, Mexico. Two primary domains were assessed: 1) clinical history, including history of sport-related concussion, and 2) pre-season neuropsychological assessment. The latter consists on answering the following paper-pencil tests: naming visuo-verbal test (NV), complex verbal material test (CVM), and similarities test (S) from the Barcelona battery; Brief visuospatial memory test-revised (BVMT-R), Hopkins verbal learning test-revised (HVLN-R), fluency test (F), digit span (D), letter-number sequencing (LN), trail making test (TMT), symbol digit modalities test (SDMT), Stroop test, and Tower of London (TOL).

## Results

From the 150 players registered within the 5 teams, we only analyzed the 75 who had the complete information. The majority are men (81%), and the average age of the whole sample is of 22.6 years; 52% are forwards and 48% are backwards. The average experience is of 2.8 years, while 43% have less than 1 year playing. In relation to clinical history: 45% have suffered a sport-related concussion, 21% present chronic headache, 20% report anxiety, and

69% have academic difficulties. The most frequent percentage of impairment was TOL total time (45%), Stroop word (44%), Naming (39%), TOL time violation (33%), Similarities (33%), TOL rule violation (23%), TOL move score (22%), and BVMT-R total recall (21%). The TOL time violation impairment was notably more frequent in backwards ( $p=0.007$ ), and the frequency of concussion was significant in forwards ( $p=0.02$ ).

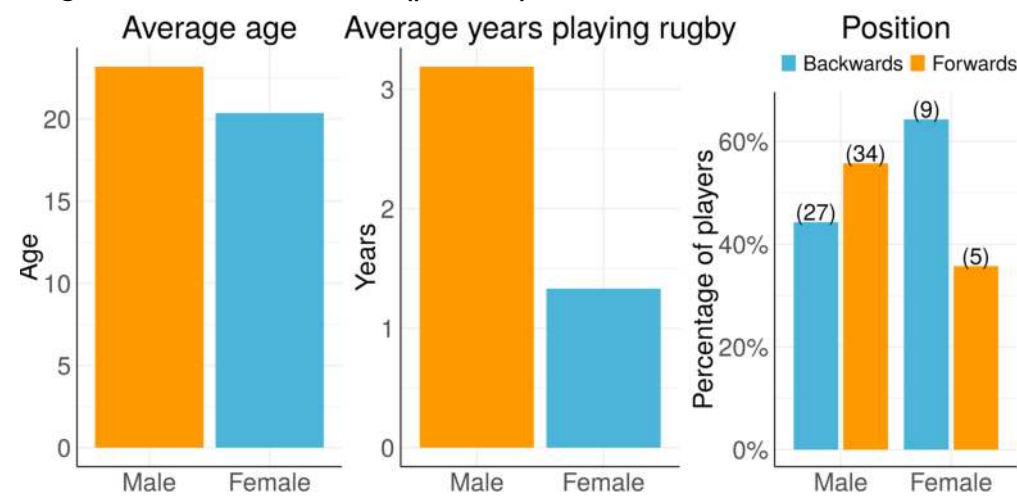


Figure 1. This graphs correspond to the average age of the players, the average years playing rugby, and the position played by men and women accordingly.

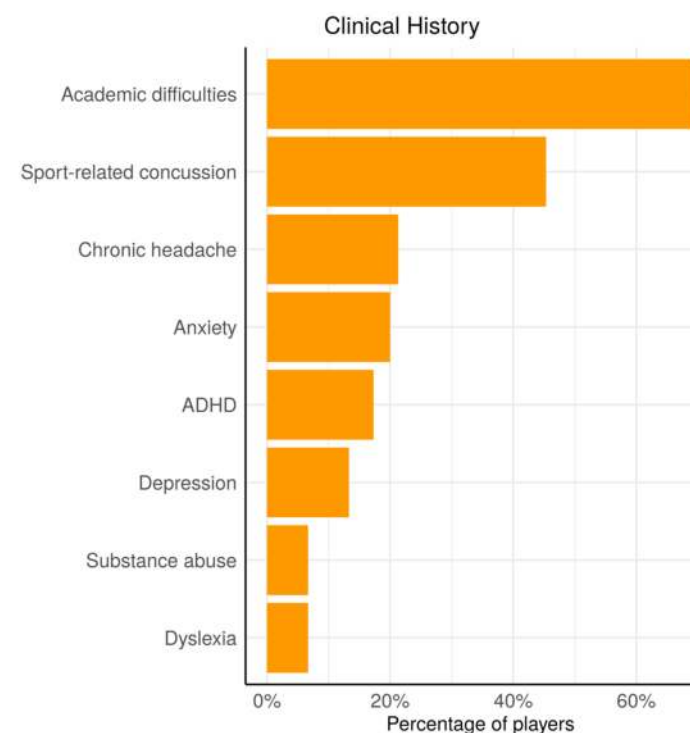


Figure 2. This graph shows the results of a questionnaire applied to the players regarding their clinical history.

## Pre-season Neuropsychological Assessment

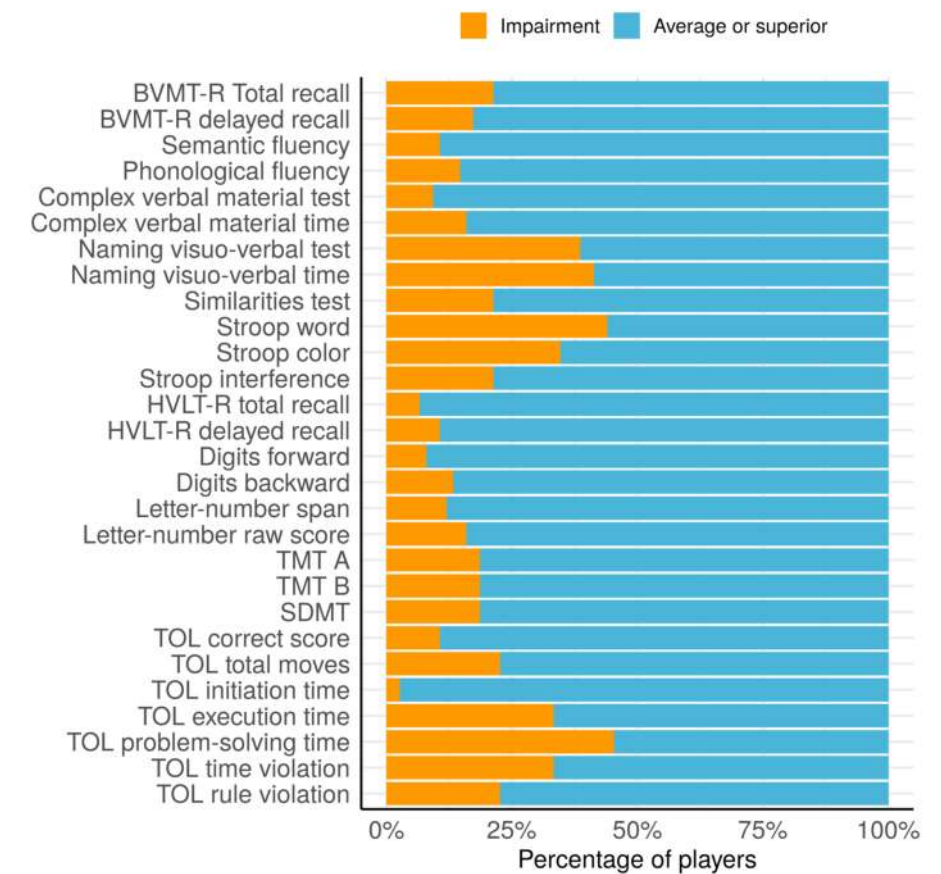


Figure 3. This graph corresponds to the neurocognitive baseline assessments and their results.

## Conclusions

Speed processing in reading and complex tasks, and naming were the most frequent impairments, followed by verbal abstraction, immediate visuospatial memory, and planning. Although no significant relationship between cognitive performance and history of concussion was found, forwards had more concussions and backwards had less speed processing in planning tasks. However, significant differences have been found, both in pre- and postseason assessments, for attentional tasks involving a visuomotor component (2). This could imply that alterations could be found upon subsequent analysis.

(1) Cross, M., Kemp, S., Smith, A., Trewartha, G., & Stokes, K. (2016). Professional rugby union players have a 60% greater risk of time loss injury after concussion: A 2-season prospective study of clinical outcomes. *British Journal of Sports Medicine*, 50(15), 926. doi:http://dx.doi.org/millennium.itesm.mx/10.1136/bjsports-2015-094982

(2) Shuttleworth-Edwards, A.B., Smith, I., & Radloff, S.E. (2008). Neurocognitive vulnerability amongst university rugby players versus noncontact sport controls. *Journal of Clinical and Experimental Neuropsychology*, 30:8, 870-884. DOI: 10.1080/13803390701846914