# INTERNET USE AMONGST PROFESSIONAL TENNIS PLAYERS

Donatella Marazziti, Elisabetta Parra, Alessandro Arone, Manuel Glauco Carbone, Luca Del Prete,
Sara Fantasia, Stefania Palermo, Liliana Dell'Osso

## Abstract

*Objective*: Next to its well-known benefits, Internet may trigger harmful consequences due to its abuse, thus delineating clinical pictures that are similar to abuse disorders, such as Problematic Internet Use (PIU). The matter becomes more elusive for sportsmen, as data regarding PIU in this specific group are scarce, particularly for tennis players. Therefore, our aim was to assess the prevalence and the features of PIU in a sample of either in current activity or retired professional tennis players, as compared with healthy controls.

*Method*: Twenty-five professional tennis players were evaluated during two events held in two different European countries and were matched to an equal number of healthy subjects who were not performing any agonistic sport. The characteristics of Internet use were assessed by a specific instrument we developed (QUNT). Statistical analyses were carried out to evaluate both demographic and QUNT features and the possible intergroup differences.

*Results*: Retired athletes presented statistically significant lower scores compared to both athletes in current activity and control subjects in the "*Time spent online*" and in the "*Addiction to pornography*" domains. Athletes in current activity presented statistically significant higher scores compared to retired athletes in the "*Ludopathy*" and Total score domains. Male athletes had a statistically significant lower score in the "*Addiction to pornography*" domain compared to both female and male healthy controls.

*Conclusions*: Tennis players frequently indulge in the use of Internet facilities, particularly those in current activity, thus potentially being more vulnerable to PIU. Men and women seem to use Internet for different activities. The lifestyle that professional tennis players are obliged to follow might provide an explanation of our findings.

Key words: internet, social media, problematic internet use, tennis, tennis players, professional tennis players

Donatella Marazziti[1,2,] Elisabetta Parra[2], Alessandro Arone[2], Manuel Glauco Carbone[3], Luca Del Prete[2], Sara Fantasia[2], Stefania Palermo[2], Liliana Dell'Osso[2]
[1] Saint Camillus International University of Health and Medical Sciences – UniCamillus, Rome, Italy
[2] Department of Clinical and Experimental Medicine, University of Pisa, Italy
[3] Department of Medicine and Surgery, Division of Psychiatry, University of Insubria, Varese, Italy

**Corresponding author**
Donatella Marazziti
Department of Clinical and Experimental Medicine,
University of Pisa,
Via Roma 57,
56100, Pisa, Italy
Phone: +39 050 2219768
E-mail: dmarazzi@psico.med.unipi.it

## Introduction

Mental health and well-being are essential to being able to perform one's best within career, academics, relationships, and sport. At the same time, sports participation is important for physical and mental health. Many athletes develop a sense of identity around their sports participation. This "athletic identity" is reinforced from early childhood and is associated with a life centered around being an athlete (Barcza-Renner et al., 2020). The athletic identity has two general components, cognitive and social. The cognitive component involves athlete behaviors required to be a high-quality athlete, including eating a healthy diet, getting adequate sleep, participating actively in practice, and maintaining hydration. The social component reflects the connection to other athletes and a sometimes-narrow interaction with other non-sports individuals, like fellow students (Benton Heird & Steunfeldt, 2013). Student athletes must exist and thrive in the sport and academic worlds or face potential social isolation from other students with a more academic focus. A strong athletic identity is often a source of support for athletes and can be very helpful for athletic performance and self-esteem (Benton Heird & Steunfeldt, 2013). Successful athletes often develop a

sense of self-efficacy related to their sport participation. Not meeting an individual's personal definition of success can result in self-doubt and limit feelings of self-efficacy, making the transition from sport is also difficult, due to a sense of failure or lack of finishing. A transition away from sport also is more difficult for those with a low educational level, chronic pain or injury, no defined employment after sport (Reardon et al., 2019), or a faltering sport career before the transition (Barcza-Renner et al., 2020). A younger age at transition tends to be more difficult for athletes who have not completed their degree or have no work outside of sport (Park et al., 2012). Any underlying mental health issues may become more prominent or difficult to control during a time of transition.

However, a sports experience can also include a number of widespread stressors. Over the years, a growing body of studies progressively revealed both the benefits and the risks associated with physical activity, in particular when performed at a competitive level (Carbone et al., 2017; Carbone et al., 2020; DeHaven & Lintner, 1986; Malm et al., 2019). Increasing focus has been directed towards the psycho(patho) logical features associated with high-level sport disciplines. Athletes can develop a variety of mental health conditions either related or unrelated to sport participation, including anxiety and stress, obsessive-compulsive disorder (OCD), post-traumatic stress disorder (PTSD), depression and suicide, disordered eating, sleep disturbance, and attentional deficit hyperactivity disorder, that is not negligible and often similar to that of the general population (Du Preez et al., 2017; Foskett & Longstaff, 2018; Gouttebarge et al., 2016; Gulliver et al., 2015; Lynch, 2021; Marazziti et al., 2021; Sundgot-Borgen & Torstveit, 2004). In addition, much interest is related to the prevalence of substance use disorders (SUD) amongst athletes, given the significant presence of excessive use of alcohol, stimulants, cannabinoids and even of more dangerous compounds, e.g., cocaine and opioids (Brisola-Santos et al., 2016; Exner et al., 2021; Murray et al., 2021). Problematic behaviors, specifically gambling and online gaming, have been also widely reported (Grall-Bronnec et al., 2016; Miller et al., 2001). Currently, these last conditions have been included in the great realm of non-pharmacological addictions, a category of behaviors with features similar to those of SUD, that has not been fully elucidated in both the general population and high-profile athletes, with the exception of the overtraining syndrome (Marazziti et al., 2014; Matos et al., 2011; Morgan et al., 1987). The excessive use of Internet is one of the most challenging behavioral addictions given that Internet is diffuse everywhere and can be ascribed to the fact that the potential of the Internet seems limitless ("all world in one hand"). The benefits are immediately rewarding, and the positive effects on almost all aspects of everyday life make it a formidable tool. However, the Internet revolution had and has a significant impact also in terms of mental wellbeing, up to real cases in which its use may become a real abuse. Not surprisingly the abuse of Internet is dramatically emerging as a latest epidemic, as, similarly to SUD and other addictive behaviors, it may lead to significant impairment in work, social and relational activities (Beard & Wolf, 2001; Widyanto & Griffiths, 2006). The first recognition of this problem dates back to 1996 when a Newyorker psychiatrist labeled as "Internet addiction" the excessive use of Internet, accompanied by withdrawal symptoms and tolerance (Young, 1996). It is worth noting here that the locution "Problematic Internet Use" (PIU) was preferred over many other common terms that more or less apply in the current research context, such as Internet addiction, pathological Internet use, compulsive Internet use, excessive Internet use, or Internet gaming disorder (Schimmenti et al. 2014). In fact, on the theoretical level, PIU is a more general and comprehensive concept than the others are. Thus, it could be more appropriate to use it in order to consider a wider range of problems related to the abuse and misuse of the Internet (Schimmenti 2017).

However, PIU and internet addiction still remain an elusive concept, to the point that it is not actually recognized as a mental disorder with nosological dignity in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association, 2013). Given the controversial diagnostic criteria, the real prevalence of internet addiction or PIU is hard to assess, as it seems to be related to the context, assessment tools, and cut-off scores (Tokunaga, 2017). In any case, it is estimated to range between 4.4 and 49.7% (Choi et al., 2009; Ko et al., 2012; Pawłowska et al., 2015; Tsitsika et al., 2016; Vigna-Taglianti et al., 2017; Wu et al., 2016), with a peak amongst students and individuals addicted to psychostimulants (Baroni et al., 2019; Durkee et al., 2012; Spada, 2014).

More recently, the use of the Internet amongst professional athletes has become a topic of growing interest, as it is widely used, with both positive and negative consequences (Encel et al., 2017). Athletes generally use the Internet to communicate with relatives, friends and fans, but also to entertain and for shopping or business purposes (Pronschinske et al., 2012). However, the current evidence on the matter is still limited for several sports and, in particular, for tennis, a sport that is as physically as mentally demanding and, as such, associated with high degrees of stress.

Therefore, the primary aim of this research was to evaluate the prevalence and characteristics of the use of the Internet and the eventual presence of PIU, through a questionnaire developed by us, the so-called QUNT, acronym of the "Questionario per l'uso delle nuove tecnologie" (New Technologies Use Questionnaire) (Baroni et al., 2019; Marazziti et al., 2021) in a sample of professional tennis players. The possible intergroup differences in the use/abuse/misuse of the Internet were also explored.

## Methods

Twenty-five professional tennis players were recruited on two different occasions: during Fed Cup Competition in Tallinn (Estonia) and during a master meeting of coaches at "Centro di Preparazione Olimpica" in Tirrenia (Pisa, Italy). The athletes were matched with a similar group of healthy subjects who were not practicing any agonistic sport, among university students, medical residents and nurses. The psychopathological assessment was carried out with the New Technologies Use Questionnaire (QUNT) (Baroni et al., 2019).

## *The New Technologies Use Questionnaire (QUNT)*

The QUNT consists of two sections, one for demographic data and another including 101 items (Baroni et al., 2019; Marazziti et al., 2021). Forty-five, out of the total 101 items, consisted of five possible answers, according to a Likert five-point scale

with 1 indicating 'completely false' and 5 indicating 'completely true'; three items were multiple-choice questions; ten were focused on the use of "instant messaging", and 42 items on the use of "social networks" (instant messaging: whatsapp, telegram, skype, and social networks: facebook, twitter and instagram). The item #101 was actually a question on the liking/utility or not the questionnaire. The scores of each item are then summed to obtain the global QUNT score. The items considered of greater relevance were put together in order to identify possible factors that are the following: "*Time spent online*" (item 2, 3, 4, 5, 6, 7, 25, 33), "*Social withdrawal*" (item 8, 10, 18, 22, 30, 35), "*Abstraction from reality*" (item 11, 13, 24), "*Loss of control*" (item 19, 20, 32, 36), "*Addiction to pornography*" (item 26, 27), "*Ludopathy*" (item 40 a-1, 41, 42, 43), "*Addiction to social networks*". (49, 50, 51, 52, 53, 54, 55, 56, 57). The "*Addiction to social networks*" factor was further divided into the following sub-factors: "*Addiction to facebook*" (item 60 a.d, 61-75), "*Addiction to twitter*" (item 76-86), "*Addiction to instagram*" (item 86-97). The factor scores were calculated as the sum of the scores obtained in each item divided by the maximum score in percentage. We established the answer 4 (between 4 and 6 hr/day) or 5 (> 6 hr/day) of the item 2 "time spent online" the cut-off points to identify the presence of, respectively, possible or certain/severe PIU, in agreement with current literature, although controversies do exist (American Psychiatric Association, 2013).

## Statistical analyses

All demographic data were presented for continuous variables in terms of mean ± standard deviation (SD). Categorical variables were expressed as frequencies (number) and percentages.

Due to the small sample size, it is not possible to demonstrate whether the data are normally distributed, thus non-parametric tests will be used.

Kruskal-Wallis test was used to determine eventual differences of various variables between three or more groups. Once Kruskal-Wallis has found significant intergroup differences, in order to determine which groups are different from others, post-hoc testing can be conducted. Dunn's Multiple Comparison Test with adjustment using Bonferroni correction was used as post-hoc test.

H expresses the test statistic for the Kruskal-Wallis test and adjusted p-value with Bonferroni correction was indicated with alpha (α).

Epsilon squared ($\varepsilon^2$) was used to estimate the measure of the effect size (0.00 < 0.01 – Negligible, 0.01 < 0.04 – Weak, 0.04 < 0.16 – Moderate, 0.16 < 0.36 - Relatively strong, 0.36 < 0.64 – Strong, 0.64 < 1.00 - Very strong).

All statistical analyses were carried out using SPSS, version 27 (IBM Corp. Released 2020. IBM SPSS Statistics for Windows, Version 27.0. Armonk, NY: IBM Corp).

## Results

A total of 25 athletes were included, of whom 18 were men (72.00%) and 7 (28.00%) were women. Their mean age was 42.3 ± 13.4 years (44.8 ± 12.8 in men and 37.9 ± 13.9 in women). Thirteen (52.00%, 10 men and 3 women) out of 25 athletes were in current activity and 12 (48.00%, 8 men and 4 women) had already retired from agonistic activity.

The control group consisted of 25 healthy subjects (13 men and 12 women, 52.00% and 48.00%, respectively), with a mean age of 33.8 ± 11.9 years (33.3 ± 9.3 in men vs 34.2 ± 14.5 in women).

For data analysis we decided to divide the sample into three groups: athletes in current activity, athletes retired from agonistic activity, control subjects.

Results of Kruskal-Wallis test and the post-hoc Dunn's multiple comparisons test, showed significant differences in the mean age, specifically retired athletes presented a statistically significantly higher value than that of both athletes in activity and control subjects (H = 15.296, α = 0.007 and α > 0.001, respectively) (see **figure 1**).

Stratifying each group by gender, it resulted that retired male athletes had a statistically significantly higher age of both females in current activity and

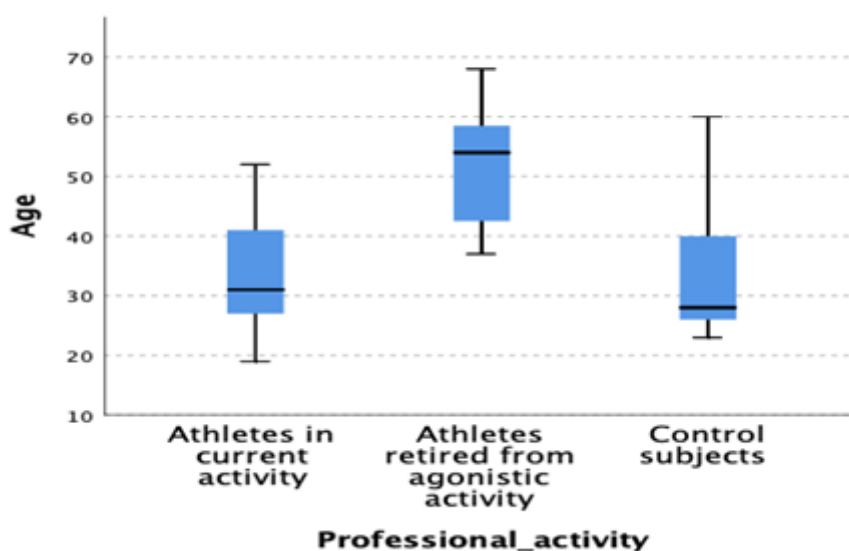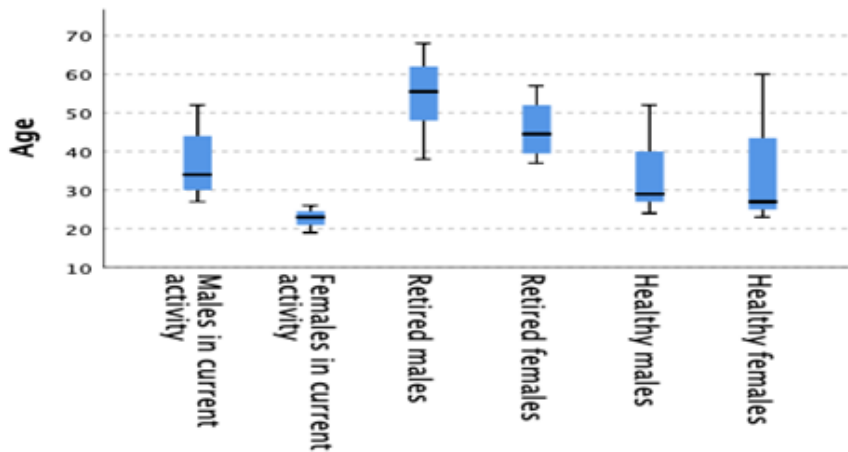**Figure 1**. *Differences in mean age between groups*

**Figure 2.** *Differences in mean age between groups, stratified by gender*



female controls (H = 21.545 α = 0.005 and α = 0.031, respectively) (see **figure 2**).

The QUNT results are depicted in **table 1**.

Retired athletes presented statistically significant lower scores compared to both athletes in current activity and control subjects in the "*Time spent online*" (H = 8.891, α = 0.028 and α = 0.019, respectively) and in the "*Addiction to pornography*" domains (H = 11.366, α = 0.048 and α = 0.003, respectively). Athletes in current activity presented a statistically significant higher scores compared to retired athletes in the "*Ludopath*y" (H = 8.023 and α = 0.015) and Total score domains (H = 7.439 and α = 0.022) (see **table 1** and **2**). Stratifying each group by gender, it resulted that retired male athletes had statistically significantly lower score in "*Addiction to pornography*" domain compared to both female and male healthy controls (H = 14.051 α = 0.031 and α = 0.025, respectively) (see **figure 3** and **4**).

## Discussion

To the best of our knowledge, this is the first study

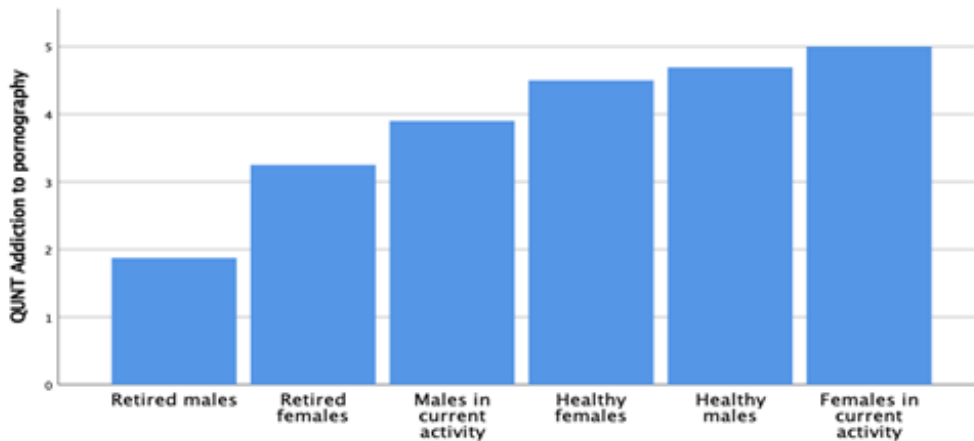**Figure 3.** *Addiction to pornography domain scores in each group*



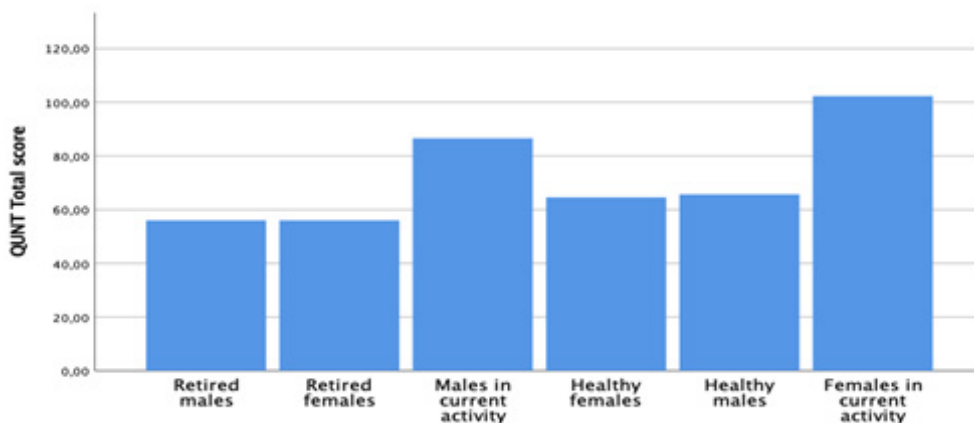**Figure 4.** *QUNT total scores in each group*

**Table 1.** *Differences in QUNT factor scores (mean ± SD) between groups using Kruskal-Wallis test*

| | Athletes in activity (CA) | Retired athletes (RA) | Controls (C) | H | p | ε² |
|---|---|---|---|---|---|---|
| Age | 33.69 ± 9.94 | 51.67 ± 10.18 | 33.8 ± 11.9 | 15.296 | > 0.001 | 0.278**** |
| Years of using | 3.92 ± 0.28 | 3.67 ± 0.89 | 3.92 ± 0.28 | 0.882 | 0.643 | 0.017** |
| Time spent online | 2.00 ± 0.71 | 1.17 ± 0.72 | 1.96 ± 0.98 | 8.891 | 0.012 | 0.154*** |
| Social withdrawal | 34.54 ± 12.03 | 23.25 ± 9.62 | 23.08 ± 8.64 | 2.654 | 0.265 | 0.029** |
| Abstraction from reality | 2.46 ± 2.43 | 1.33 ± 1.07 | 1.92 ± 2.68 | 1.390 | 0.499 | 0.015** |
| Loss of control | 1.85 ± 1.28 | 2.17 ± 1.34 | 2.00 ± 1.19 | 0.211 | 0.900 | 0.002* |
| Addiction to pornography | 4.15 ± 1.95 | 4.33 ± 1.37 | 2.60 ± 1.91 | 11.366 | 0.003 | 0.222**** |
| Ludopathy | 18.15 ± 8.53 | 10.08 ± 6.04 | 12.72 ± 5.07 | 8.023 | 0.018 | 0.106*** |
| Addiction to social networks | 23.46 ± 14.01 | 11.00 ± 8.28 | 14.44 ± 6.18 | 5.737 | 0.057 | 0.077*** |
| Total score | 90.23 ± 39.45 | 56.00 ± 17.63 | 65.16 ± 17.56 | 7.439 | 0.024 | 0.097*** |

Legend. * Negligible; ** Weak; *** Moderate; **** Relatively strong.

**Table 2.** *Differences between groups showing adjusted p-value with Bonferroni correction (α)*

| Features | Kruskal-Wallis test | | Dunn's multiple comparisons test | | |
|---|---|---|---|---|---|
| | | | CA-RA | CA-C | RA-C |
| | H | p | α | α | α |
| Age | 15.30 | > 0.001 | 0.007 (RA > CA) | n.s. | 0.001 (RA > C) |
| Time spent online | 8.891 | 0.012 | 0.028 (CA > RA) | n.s. | 0.019 (C > RA) |
| Addiction to pornography | 11.366 | 0.003 | 0.048 (CA > RA) | n.s. | 0.003 (C > RA) |
| Ludopathy | 8.023 | 0.018 | 0.015 (CA > RA) | n.s. | n.s. |
| Total score | 7.439 | 0.024 | 0.022 (CA > RA) | n.s. | n.s. |

assessing the use of the Internet among tennis players, either in current activity or retired, by using the self-assessment questionnaire called QUNT developed by us to explore the use of the Internet amongst tennis players, as compared with healthy controls (Baroni et al., 2019; Marazziti et al., 2021).

In our opinion, the present study led to some noteworthy, albeit preliminary intriguing findings.

Tennis players in activity and healthy controls presented higher scores compared to the retired ones in the "*Time spent online*" and "*Addiction to pornography*" domains.

Moreover, active tennis players showed higher scores in the "*QUNT total score*" and "*Ludopathy*" domains compared to retired ones, but there were not statistically significant differences regarding healthy controls.

Different factors might explain such data. First of all, the mean age of the active athletes is lower than

that of the retired ones, so that this factor cannot be ignored, as young people tend to increasingly use the Internet (Choi et al., 2009, Ko et al., 2005; Marazziti et al., 2020; Winds et al., 2022).

The "age" factor also provides a rationale for the greater use of texting, streaming and social media, as these are activities that are mostly, even if not exclusively, the prerogative of young people. This element could also justify the higher scores totalized by healthy controls (having a lower average age than retired players) in the "Total Score" and "Addiction to pornography" domains compared to retired players.

Secondly, these data might, albeit partially, support the notion of the "stress related use" among high performance athletes; this is not surprising while considering the high level of stress related to intensive training, the peculiar lifestyle characterized by reclusion and long periods away from families, friends and lovers of high-rank tennis players, all factors promoting the

use of Internet and social media.

Furthermore, social and economic reasons may contribute to this discrepancy. Indeed, following the massive use and often abuse since their roll out, social media (Facebook, Instagram, Twitter and TikTok) represent a good opportunity for the athletes to bond with fans, who may feel deeply engaged (Mullin et al., 2014). Indeed, the athletes may feel rewarded by sharing features of their professional and personal lives, and original posting and sociality are also frequently rewarding (Pronschinske et al., 2012). Moreover, social media represent a real means of business, due to branding, merchandising, and content production, thus overall building a worldwide network (Mullin et al., 2014).

Finally, higher scores in the "*Ludopathy*" domain among active players are not surprising.

Athletes may be particularly at risk of a gambling disorder as a result of their over-representation of young men, their high degree of competitiveness, high levels of sensation-seeking, impulsivity, increased risk-taking behaviors, and their perceived knowledge and information concerning sports and the health of teammates. Reported prevalence rates of gambling disorders among elite athletes typically are higher than their non-athletic peers (Derevensky et al., 2019). Further, male athletes showed problematic video gaming, without association with hazardous alcohol drinking or treatment for psychological distress (Håkansson et al., 2018). Although QUNT evaluates online gaming, it does not represent a diagnostic tool for Internet gaming disorder, according to DSM-5 criteria. However, it is plausible that it might be a cue or a predictor of this disorder (Chen et al., 2018).

The paucity of the studies so far makes it hard to extrapolate conclusions on the matter, but we may consider that the lifestyle required to play tennis at such a high level should decrease the amount of time available for recreational activities that are limited to those offered by Internet and social media.

The present study suffers from some limitations that include the small sample size. It should be, however, underlined that it was not easy to recruit the overall sample of athletes, especially of those in current activity, as they continuously complained of shortage of time, even when they had to complete a short questionnaire like the QUNT requiring no more than 10 minutes. Again, the sex composition was not balanced, and this prevented us from performing reliable statistical analyses in the two sexes, especially within tennis players' groups. For this reason, we cannot draw any definitive conclusions on the presence of PIU amongst athletes and eventual gender differences (Macur et al., 2016; Marazziti et al., 2020; Mei et al., 2016; Su et al., 2019).

## Conclusions

The Internet has greatly revolutionized the global population's everyday life worldwide, as its potential seems limitless. However, its excessive use may lead to negative consequences that might cloud its unequivocal benefits, up to the point of becoming an addiction.

This phenomenon is present everywhere, but especially amongst young generations and students. However, even high-level athletes are not immune from excessive use of Internet. It is interesting to mention the episode occurred during the last Olympic games held in 2021, when the trainer of the Italian national female volleyball team charged the loss of a match to the excessive use of Internet by the players.

The results of the present study are the first gathered in high-level tennis players in current and past activities.

Our data could indicate that high-level athletes in current activities, given the intensive training and the pressure to attain and/or maintain elevated standards of results (it might require more relaxation through Internet to cope with the matches) as well as economic and marketing interests related to social networks, represent a potential population vulnerable to problematic internet use.

More research is necessary to determine the direct impact on athletic performance and whether athletes in certain sports are more prone to develop internet addiction. At the same time, Ludopathy or Gambling are often a hidden addiction and the related consequences could be devastating for elite athletes and the integrity of the sport.

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