Gaming addiction

When going online goes off-kilter

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Though there still is much study needed on precise diagnosis and effective treatment options, there are clearly children and teens for whom online gaming presents physical, social, and developmental risks and consequences.

In your practice, has a parent ever made a comment like "My child disappears into a room, and, hours later, I realize they have been playing video games the entire time. Is that OK?"

Increasingly, reports are emerging that some children and adolescents become preoccupied with Internet gaming. These "gamers" may demonstrate compulsivity and exclude other interests as a result of online gaming that leads to clinically significant impairment or distress. There has even been a report of a death in an adult man following a 3-day gaming binge.[1]

Multiplayer online roleplaying games (MORPGs) are among the most popular, with nearly half of all online gamers playing games such as "League of Legends" and "World of Warcraft." "League of Legends" is a free-to-play game that has 67 million players and has made more than $1 billion through in-app purchases. "World of Warcraft" requires a monthly subscription and reports more than 10 million subscribers with more than a billion dollars revenue annually.[2,3]

> **FAST FACT**
> In 2007, an Ohio 17-year-old fatally shot his mother for taking away his *Halo 3* game.
> —*The Plain Dealer,* Dec. 15, 2008

Why are kids attracted to online gaming?

A number of motivations are behind children and adolescents' increased time with online gaming. Multiplayer online roleplaying games, for example, provide children and adolescents with opportunities to achieve goals, socialize with other players, and immerse in an online fantasy game

world. Gamers achieve goals in several ways in online gaming. "Leveling up" is one's progress in the game. As a result, the player acquires status and power in the game. Reputation in the game becomes a continued motivating factor for play. Players also optimize play and have the opportunity to overcome challenges and dominate other players.[4,5]

Socialization is a key component of gaming and is one reason MORPGs are so popular. This includes chatting in the game, making friends, forming relationships, and working as a team. This interaction between real and virtual social networks blurs differences between the 2, making MORPGs intrinsically more social activities.[4]

Immersion into games is characterized by discovery and self-expression. Children and adolescents discover hidden game content (an aspect that may drive continued play) by exploring a digital fantasy world and role play via an avatar that they are able to customize (eg, gender, race, profession). Escapism is a mood modification concept in which an individual is able to shift mood by engaging in a particular behavior. As a result, daily gaming may become a coping strategy to address everyday problems.[4]

What is problem digital gaming?

Digital gaming may be a problem if any child or adolescent persistently and recurrently participates in computer gaming at the neglect of personal, family, or educational responsibilities.

Problem digital gaming displays many aspects of addiction with which the pediatrician is familiar.

TABLE — PROBLEM DIGITAL GAMING BIOPSYCHOSOCIAL PROCESSES

SALIENCE A child or adolescent demonstrates gaming is the single most important activity in his or her life. Gaming may dominate thinking through preoccupation with or display of cravings for the activity, eg, a child may constantly talk about gaming activity when not playing, or think or bother a parent about the next time they can play the game.

MOOD MODIFICATION The subjective experience children and adolescents report as a result of Internet gaming, eg, a child may report a "buzz" or "feeling of escape" associated with Internet gaming, much like that seen with other drugs.

TOLERANCE Need for progressively increased amounts of Internet gaming to achieve the previously mentioned mood modifying effects. Children and adolescents spend more and more time each day gaming.

WITHDRAWAL SYMPTOMS Unpleasant feelings or physical effects that occur if a child or adolescent is not able to engage with Internet gaming, eg, moodiness or irritability as a result of not being able to play.

CONFLICT Interpersonal and life conflicts that result from the time and effort placed into gaming, including conflicts between the child/adolescent and a parent, as well as impacts on school activities or hobbies. There can also be interpersonal conflict, eg, loss of control as a child or adolescent becomes concerned about spending too much time gaming.

RELAPSE Return to excessive gaming activity following a period of discontinuation.

From: Griffiths[6]; Király et al[7]

These biopsychosocial processes contribute to addiction and include salience, mood modification, tolerance, withdrawal symptoms, conflict, and relapse (Table).[6,7]

In the latest version of the *Diagnostic and Statistical Manual of Mental Disorders (DSM-5)*, the term "Internet Gaming Disorder" is labeled as a condition that requires more research and experience, and it may be considered as a formal, listed disorder in the future. It is classified as a subtype of Internet addiction. The manual refers to "persistent and recurrent use of the Internet to engage in games, often with other players, leading to clinically significant impairment or distress" as indicated by 5 or more of the following criteria in a 12-month period:[8]

- Preoccupation or obsession with Internet gaming, eg, thinking about next gaming experience
- Withdrawal symptoms when not able to play or prevented from

playing Internet games, eg, irritability or sadness

- Needing to spend increased amounts of time playing Internet games, ie, increasing tolerance
- Trying, but failing, to stop or decrease Internet gaming time
- Loss of interest in previously pleasurable activities except Internet gaming
- Continued Internet gaming in the face of/despite knowledge of adverse impacts, eg, bad grades, poor relationships, job loss
- Lying about Internet gaming time and activities
- Internet gaming providing escape from negative moods, eg, anxiety, depression, helplessness
- Internet gaming jeopardized or lost a personal relationship, school, job.

The disorder is further classified as mild, moderate, or severe depending on the degree that symptoms impact the individual.

How common is problem digital gaming in pediatrics?

The first reports of Internet gaming addiction appeared in the early 1980s and have increased as online games have proliferated and researchers have increasingly studied the topic. Country level estimates of Internet gaming addiction range from as low as 0.2% in German teenagers to as high as 50% of Korean teenagers in 2006.[4]

With a tremendous investment in a digital infrastructure, South Korea may be a look into what pediatricians may face in the United States. In 2009, the percentage of youth believed to have Internet addiction based on results of a national survey was down to 12.8% after significant

efforts at the governmental level.[9]

Gaming addiction is considered a significant public health problem in Southeast Asian countries, and governments have taken steps to curb the problem.

In South Korea, nearly 25% of children and adolescents diagnosed with Internet gaming addiction are hospitalized, and Japan has created "fasting camps" where diagnosed individuals are allowed to completely disconnect from technology.

In the United States, the reSTART Internet Addiction Recovery Program (including outpatient treatment for adolescents aged 12 to 18 years) in Seattle, Washington, and the Internet Addiction Program in Bradford, Pennsylvania, have opened inpatient units for Internet gaming addiction in recent years.[4]

Exact epidemiologic numbers are difficult to determine in the United States, as researchers do not always agree on diagnostic criteria or definitions. Studies looking at the issue, however, have found a range from 2% to 7%.[10]

Even if the most conservative estimates represent the true prevalence, pediatricians face a significant public health impact.

What are consequences of problem digital gaming?

Problem digital gaming can lead to a number of adverse consequences for children and adolescents including:[4]

- Sacrificing real-life relationships
- Lack of real-life relationships and obsession with gaming

- Decreased involvement in extracurricular activities
- Decreased sleep
- Decreased attention
- Increased aggression and hostility
- Decreased school performance
- Problems with verbal memory
- Stress
- Low self-esteem
- Loneliness
- Dysfunctional coping mechanisms
- Psychosomatic challenges.

Problem digital gaming and neuroscience

Although many parents and pediatricians see it as a social or behavioral problem, problem digital gaming is increasingly linked to biology.

Neuroimaging assessments in Internet gaming addiction studies reveal this addiction is similar in molecular and neurocircuitry components to substance-related addictions.

FAST FACT
Most pathological gamers (84%) are still pathological 2 years later.
—Gentile et al. *Pediatrics.* 2011 Feb;127(2):e319-329.

For example, gaming is known to release striatal dopamine, which is involved in the reward system that may lead to abstinence symptoms, tolerance, and withdrawal in other addictions.

When gaming, stimulation of brain areas associated with addiction (eg, orbitofrontal cortex, cingulate gyrus) is frequently seen, and alterations in neuronal connectivity and brain structure can result. Taken as a whole, evidence suggests a relationship between brain alterations and Internet gaming addiction and that problem digital gaming can potentially result in changes to

underlying neurobiology.[4]

Assessment tools

A number of different tools can assist pediatricians in assessing problem digital gaming in addition to the *DSM-5* criteria previously mentioned. Because there has not been a previously well-accepted definition and researchers may focus on different clinical indicators, the assessment tools often focus on varying aspects of problem digital gaming. A recent systematic review identified the Problem Videogame Playing Scale as capable of identifying Internet Gaming Disorder based on *DSM-5* criteria, and the Game Addiction Scale identified 8 of 9 criteria.[11-13]

Fifteen of the 18 identified instruments contained fewer than 20 items and could be administered by a staff member or through self-administration in under 20 minutes.[11] As criteria for Internet Gaming Disorder are evolving, it may also be worthwhile to consider an assessment such as the Internet Addiction Test (IAT), one of the first instruments validated to assess Internet addiction.[14]

Even if the pediatrician is not going to implement one of these tools in his or her practice, a review of them may help with the sort of questions that need to be answered to determine if a child or adolescent is at risk for problem digital gaming.

Advice for parents

One of the mainstays of pediatric treatment is advice and guidance for parents. However, it is not likely that many currently practicing pediatricians have received training on problem digital gaming. Dr

Kimberly Young, developer of the IAT, expert on Internet addiction and digital treatment, and founder of the Center for Internet Addiction, makes the following general suggestions related to Internet addiction that can be applied to gaming:[15]

Do not use Internet or gaming as a babysitter. Advise parents not to use gaming or the Internet as a babysitter. Parents often believe that technology is good for children and may not be aware of problems that can evolve. The American Academy of Pediatrics recommends that children have fewer than 2 hours of screen time per day.[16]

Educate children on responsible Internet use and gaming. Parents often do not realize how their children will use devices or games, and should be encouraged to set rules and boundaries before children are allowed to spend time gaming online. Parents need to understand and teach their children how to use technology responsibly.

Examine impact of addiction on the family. Addiction tends to run in families, and children and adolescents exposed to other addictions may have an increased risk of online gaming or Internet addiction.

Identify risk factors. Patients suffering from one or more mental health disorders appear at increased risk. Additionally, children and adolescents demonstrating rumination, short-term thinking (avoiding

problem solving and enjoying online gaming rather than addressing problem behavior) are at increased risk. Males seem to be at increased risk compared to females.

Encourage other activities. Encourage increased amounts of family time and family activities that get children out of the house.

Internet gaming addiction and problem digital gaming can potentially result in changes to underlying neurobiology.

Parents can set strict time limits during which children are allowed to play games online. The earlier they do this, the less painful it will be for children and it will be the norm.

Learn warning signs of addiction. Parents need to recognize warning signs like decreasing school performance, excessive thoughts about games when not playing, lying about gaming time, missing school work, cravings, or withdrawal symptoms such as irritability or inappropriate behavior when taking games away.

Intervene. Advise parents to spend time with their children doing things their children like to do, and encourage positive group activities like sports or service clubs. Parents should enforce rules consistently and be positive role models.

Available treatments

Although problem digital gaming is not new, systematic research into treatments and efficacy appears to be in its infancy.

The recent inclusion in the *DSM-5* may stimulate more research interest. Currently, however, the treatment literature of problem digital gaming is limited by several factors. These include lack of consistent criteria to identify problem digital gaming or diagnose Internet Gaming Disorder; failure to assess formative change post treatment and follow-up; no long-term follow-up; failure to follow long enough post treatment to assess recovery and relapse; measures post treatment that only include symptomatology and behavioral measures of problem digital gaming; and small sample sizes.[17]

At this time, there is insufficient evidence to recommend one treatment over another or that treatments provide a long-term benefit.[17] Many studies are also limited because of being conducted predominately in southeast Asian populations that may be significantly different from the population US pediatricians treat. These studies, however, do allow the pediatrician to understand what therapies have been tried and may help guide further research or treatment in their practice.

Cognitive behavioral therapy

Cognitive behavioral therapy (CBT) interventions are the most commonly described treatment for problem digital gaming or Internet Gaming Disorder, and CBT for Internet Addiction has recently been developed.[18] Cognitive behavioral therapy for Internet Addiction often occurs in individual or group sessions over 12 or more weeks and allows children and adolescents with problem digital gaming to understand addictive feelings while learning coping and relapse prevention skills.[18]

Cognitive behavioral therapy for Internet Addiction for problem digital gaming frequently progresses through 3 phases. In the first phase, children and adolescents learn to manage their time both online and offline. In the second phase, cognitive therapy is utilized to address denial of a problem and rationaliza-

> *One study suggests bupropion SR may change craving and brain activity as it does with patients experiencing substance abuse or dependence.*

tion of excessive online activity. The third phase often incorporates harm reduction therapy and addresses any coexisting factors leading to Internet addiction, as well as strategies for relapse prevention.[18,19]

Several studies have demonstrated outcomes such as decreased Internet use, improved abilities to control Internet use, decreased signs of withdrawal, decreased preoccupation, and improvements in use of Internet as a form of escape. Others have looked at specific time management skills, and irrational and other cognitive distortions related to online gaming. Drawing more than general conclusions is difficult, as all studies had a number of methodological flaws and interventions and assessments were not standardized. However, all showed positive, short-term results.[18,20–22]

➕ For full article and references, go to **ContemporaryPediatrics.com/gaming**

RESOURCES

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