Chapter 5
Virtual Reality (VR) as Medical Prevention of Adverse Childhood Experiences (ACEs)

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ABSTRACT
This chapter identifies numerous cases on adverse childhood experiences (ACEs) and their link with post-traumatic stress disorders (PTSD). It explores the use of virtual reality (VR) as a clinical tool in diagnosis, prevention and treatment of ACEs. The emotional, physical, psychological and cognitive demands of a child going through ACEs are discussed using scientific researchers. The purpose of this chapter is to introduce the beneficial uses of virtual reality (VR) in the prevention, diagnosis, and treatment of ACEs.

INTRODUCTION
The chapter introduces the use of VR as a clinical instrument to address the appraisal, counteractive action, and treatment of ACEs. A concise discourse of the definition and method of reasoning for clinical utilization of VR is trailed by a depiction of VR application intended for the conveyance of prolonged exposure (PE). The clinical utilization of VR is discussed, especially in regard to its ability to break down barriers.

VR’s Role in Treating ACEs
Child maltreatment is a serious and general public health concern in the United States. Studies (Zimmerman & Merci, 2010), revealed that the public child protective services agencies received in 2007 reports of alleged maltreatment involving 5.8 million children. Sixty-two percent of reports to child protective services, involving 3.5 million children, were screened for further investigation; 794,000 were determined to be victims of abuse or neglect. In 86% of these cases, parents or other relatives were responsible for the maltreatment. Neglect was the problem in 60% of the cases. Young children, under

DOI: 10.4018/978-1-5225-7168-1.ch005
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7 years old, constitute the majority of child abuse/neglect cases (55.7%) and suffer the greatest harm. Infants less than 1 year old have the highest rates of child victimization at 22 victims per 1,000 children (Zimmerman & Merci, 2010). The Economic Burden of Child Maltreatment in the United States and Implications for Prevention (Fang et al., 2012), found the aggregate lifetime monetary expenses related to only one year of affirmed instances of child abuse such as sexual abuse, physical abuse, neglect and physiological abuse to be about $124 billion. VR plays an important role in treating ACEs because it has a variety of uses. A study (Slater et al., 2010) presented by researchers of the University of Barcelona showed that VR experiences may improve empathy in violent people having lack of emotional recognition. According to Slater et al. (2010), virtual bodies can be radically not quite the same and the involved individual goes under a subjective illusion of owning the virtual body. The illusions participants are subjected have a strong impact altering perceptions, behavior, and attitudes of the participants (Slater et al., 2008, 2009). The results of the research (Slater et al., 2010) revealed that bottom-up perceptual mechanisms can temporarily override top down knowledge resulting in a radical illusion of transfer of body ownership. Moreover, immersive virtual reality is a powerful tool in the study of body representation and experience (Slater et al., 2010).

CHILD MALTREATMENT (CM): A SERIOUS HEALTH PROBLEM

Childhood experiences have a great impact on the future of a person. Researchers refer to such experiences as Adverse Childhood Experiences (ACEs) (Foege, 1998; Hardt & Rutter, 2004). ACEs Include:

- Sexual abuse
- Physical abuse
- Emotional abuse
- Physical neglect
- Emotional neglect
- Household substance abuse
- Mother treated violently
- Parental divorce and separation
- Mental household illness
- Poisoned household member

ACEs have been linked to chronic health conditions, risky health behaviors, early death and low life potential. These events can be single, acute or sustained over time. These conditions may include the detrimental effect of the community, parents’ death, poverty and violence. Most children aged between 0 to 18 have one or more ACEs. Childhood stress may become toxic with time if prolonged, leading towards activation of the body’s stress-response system. The biological reaction to toxic stress can drastically affect the health of a person and last a lifetime. Most common life-threatening conditions that researchers have studied include heart disease, obesity, drug use and alcoholism. A child who suffers from ACEs can have behavioral and learning issues. These effects move on through generations if these traumatic conditions are not resolved. The financial loss to society and the individual is also significant (Herman et al., 1997; Foege, 1998; Hardt & Rutter, 2004; Zimmerman & Merci, 2010). Technology that helps diagnosing the health of an individual from infancy to adulthood is now available. It allows us to