

# Comparing Injury Rates on a Fixed Equipment Playground and an Adventure Playground

## Abstract

A statistical analysis of serious student injuries that occurred during play was undertaken at The Parish School in Houston, TX. Data was collected over a five year span. While serious injuries during play were rare, a statistically significant majority of them occurred on the fixed equipment playground. The adventure playground at the same school was found to be statistically safer.

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## Introduction

Over several decades, the places set aside for children's play have become more closely regulated by adults. Play equipment is bought from catalogs, designed to be unchanging for years and built according to Federal standards. In schools, recess times are being reduced or cut entirely. Staff are trained to look out for conflict and, when it erupts, punishments are often swift and severe.

All this was intended to keep children more safe. Has it?

The 'adventure playground' model offers an alternative. Adventure playgrounds are fenced, professionally staffed sites where children are given access to junk materials like wooden pallets, tires and wheeled carts. Hammers and nails, shovels and saws can be used both to build and destroy. Staff avoid intervention unless absolutely necessary, favoring more subtle approaches.

Those who advocate for adventure playgrounds, who staff and study them, often refer to what happens on these sites as "risky play". However, we've seen children seek out opportunities for risk and challenge everywhere they go. This left us wondering, where are children actually, *statistically*, safer to play?

The Parish School offers a unique case study. On its campus are two playgrounds, conventional and adventure, used by the same population. We gathered five years of accident reports to examine the actual, comparative likelihood of serious injury.

This is what we found.

## The Parish School and Population

The Parish School is a private school in Houston, Texas, opened in 1983 by Robbin Parish for children underserved by mainstream education. Terminology changes often, but today frequent student diagnoses include dyslexia, selective mutism, attention hyperactivity disorder, and autism spectrum disorder. Coordination and sensory disorders are also common.

Practically speaking, this means some children at the Parish School have difficulty walking across uneven ground or reading social cues. Some experience a deep revulsion in response to certain textures or sensation. Others have poor muscle tone. These struggles can be so specific that Parish AP staff refer to them as 'holes' in a child's play. For example, a child may be able to climb like a mountain goat, but not understand that a friend standing far away can't hear him.

The difficulties experienced by children at Parish are a matter of degree, and can be plotted on a spectrum that includes every human being. No one has perfect control over their body, or an absolute understanding of one another. Physical, social and emotional

skills are developed during play, and gaps in abilities may be compounded by play deprivation.

### **The Authors and this Study**

Jill Wood and Morgan Leichter-Saxby both acknowledge a career bias in favor of adventure playgrounds. To correct for that bias, this study is grounded in quantitative data gathered by a neutral party. However, firsthand experiences of AP and other background knowledge informed their interpretation of those findings.

### **Recess**

Elementary-aged children have recess twice a day, with each break lasting between ten and thirty minutes. The playground is behind their classroom buildings, landscaped with fixed equipment bought in 2006. The area includes a climbing frame with ramp and ladders, a short climbing wall and two slides. A tall set of four swings made from chains and flexible rubber seats is supplemented by a rotating tire swing. Each of these are in islands of wood chip, surrounded by grass. During the years of this study, no other loose parts were available.



*Parish fixed equipment playground. April 2016. Photo credit Alex Cote*



Children race towards the swings, run over a large grassy mound, and hunt lizards with their friends. Recess time is staggered, so children tend to be outside with the same people they see in class. Recess staff are either the children's classroom teachers or, more often, their paraeducators. At the time of this study, recess staff were not provided with specific training in play support. Some members of recess staff participate as a growling monster during chase games, or mediate disputes. Others roam, enforcing certain behaviors and discouraging others, or stand back to chat with colleagues while keeping a more distanced eye. Rules are generally enforced to prevent children from engaging in play that paraeducators deem risky or socially inappropriate. Some rules, such as climbing up the slide, are inconsistently applied.

## AP

The on-site after-school provision known as AP opened in 2008 and now enrolls up to 45 children who can play for up to two and a half hours, Monday through Thursday, in a continually changing environment. The three acre site is filled with reclaimed lumber and large objects, which include grocery store shopping carts, municipal drainage culverts, buckets of paint and stacks of loose tires. Most materials are clustered at the center, around a covered hardtop. There is also a large sandpile, with hosepipes and sinks nearby. On hot days, AP plugs in a large misting apparatus and makes a slip-



*Parish AP. April 2016. Photo credit Alex Cote*

and-slide on one of several tarpaulins. Hammers, saws, buckets of paint and plastic ducks are carried freely around the landscape and only gathered in by staff before the grass is mowed. There are several fort constructions of constantly changing size and character, including one at a distance from the rest of the site built on stilts. Beyond this area is a patch of tall grass, where the children can walk in groups of three or more.

Staff are trained in the professional approach called 'playwork' by site senior Jill Wood and Pop-Up Adventure Play. Like other playworkers, they do not guide children's behavior but do sometimes suggest options or help interpret social cues. Rules and restrictions are minimal. The children's social and physical risk-taking is monitored, but accepted. Playworkers also take on a role of companion; they may accept children's challenges to a stick fight, provide assistance in building projects, listen to stories and have their fingernails painted. Playwork is a reflective and non-judgmental approach, with significant time also spent in observation and site maintenance.

### **Who got hurt, where and how?**

When a child is injured on campus, a detailed report is made by the school nurse. The authors limited their study to 'serious injuries' only, which they define as anything that required off-site treatment or care. This included any child who was taken to Urgent Care or for X-rays, regardless of treatment.

Between August 2010 to May 2015, there was a total of 10 such incidents. All children's names have been changed.

- Franklin fell down and split his eyelid, requiring stitches
- Rohana fell and hit her head on a handrail. She was taken to the minor emergency clinic, where glue was used
- Mirabel fell from a ladder and landed on her arm. When she continued to complain of pain, an X-ray was made to rule out possible fracture
- Eric put a rock in his ear, which had to be removed medically
- Duke had a deep cut on his finger and received four stitches, cause unknown
- Noah fell from a ladder, sustained a slight fracture and was given a cast
- Levi's finger was crushed and he was taken to the doctor with a suspected fracture
- Tonia fell from the zip line, fracturing her arm and receiving a brace
- Levi was climbing a ladder that slipped, and may have fractured his arm. He was given a splint
- Everett fell from a roof beam, fracturing his arm. He received a flexible cast

Of these, the first five occurred during recess and the last three at AP.

### A note on numbers

Tonia's incident occurred during a visit made outside of AP hours, when she was helped onto a zipline she could not reach independently. Playworkers simply would not do this, and trained playwork staff are one of the 'essential elements' of an adventure playground.

This incident was removed from calculations as the question was whether recess or AP were safer as *forms of provision* and not as areas of campus.

### Statistical analysis

The goal of this analysis is to determine the relative risk, or comparative likelihood, of a child being hurt at recess or AP. First the number of children was tallied (population) and total hours both sites were used (hours of provision). Then total exposure to risk was calculated, or the number of hours spent by one child in each form of play provision:

$$\text{Exposure} = \text{population} \times \text{hours}$$

'Injury rate', is the total number of serious incidents over this period. To calculate the injury risk, the injury rate is divided by exposure.

$$\text{Injury risk} = \text{injury rate} \div \text{exposure}$$

This provides the 'injury risk', or the statistical likelihood of any one child being seriously injured in any given hour spent on site.

### Findings

	Population	Hours of provision	Hours of Exposure	Injury rate	Injury risk
AP	150	1710	256500	2	0.00078%
Recess	424	490	207760	7	0.00336%

The first thing to say is that both sites carry an *extremely* low risk of serious injury, when compared to many other popular activities.

To provide some context for that statement, the rates have been put into a table created by UK-based risk theorist David Ball (2002). This table includes studies of very different methodologies so this comparison is intended only as illustration for comparative risk. He calculates risk per 100,000 hours of exposure, so the Parish data has been converted to match.

Activity	Injury risk (per 100,000 hours)
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Rugby	290
Soccer	130
Field hockey	90
Basketball	40
Visiting a fairground	20
Tennis	15
Running/jogging	5
Being at home (15 and younger)	4
<b>Playing at Parish School recess</b>	<b>3.37</b>
Golf	2
Table tennis	1
<b>Playing at Parish School AP</b>	<b>0.78</b>
Snooker	0.1

AP was 4.3 times safer than recess. The environment which adults frequently describe as 'risky' or dangerous is, in fact, slightly safer than golf. Both sites are safer, on average, than simply being at home.

#### **Another note on numbers**

If Tonia's incident had been included (the omission discussed above) AP would carry an injury risk of 0.0011% or 1.1 per 100,000 hours, and still be almost 3 times safer than recess, though more dangerous on average than table tennis.

#### **What might be a common factor in these injuries?**

To offer context for this data, Jill Wood drew upon firsthand memories of each injury that happened on AP. She had less context for the injuries during recess, but noted that three of the five had occurred on the same piece of fixed equipment. AP is filled with opportunities to climb and slide and swing, generally made by nailed-together pallet wood and junk. What was the difference?

Children have an intimate knowledge of AP, not only as frequent users but as creators. Their continual re-design and alteration of the equipment allows them to increase their levels of risk slowly and incrementally as they grow. Of three ladder-related injuries, two occurred on the adult-designed equipment and one on AP, where a fort ladder had been changed without the climber's knowledge. Another child had fallen from the only adult-built structure on AP, called the Community Center. Jill believed that there had been a

disproportionate number of minor injuries there as well, and has since made that area into a place for parents to wait at pick-up.

### **The day's many wounds**

The nurse's records were packed with stories of minor injury. Many simply resulted from being outside, including bites from fire ants and mosquitoes as well as sunburn and overheating. Children also visited her office with small playground equipment injuries, having got their fingers stuck in the swing's chain or scraped their palms on the slide. One child got mulch trapped in his teeth (the nurse noted her suspicion that he was eating it on purpose), and others fell from the monkey bars or burned their fingertips on the black plastic matting.

Children were not only injured during play. In PE, they got burned by ropes, struck by wiffle balls, hit in the face by kick balls and Frisbees. Fingers got stepped on, and a host of injuries were caused by things in eyes, such as crayons, pencils, glitter and fingers. Children bumped their heads on poles and desks. One child twisted her ankle while walking on level ground, and another busted his lip "doing a yoga move". Bites broke skin, both other children's and one's own. One child hit another with a small toy train. Another fell from a mini trampoline. Two children smashed their faces together, each getting a bloody nose in the process.

There were also seven serious injuries which occurred somewhere other than a playground:

- Rocco fell on the way to class and hit a wooden pole, putting a tooth through his lip. No stitches needed.
- Braden slammed his finger in the bathroom door, breaking it in several places
- Manuel stood up in a wagon used to move between classes, which was then pulled from under him. A pediatrician ruled out concussion.
- Eli slipped on bricks outside of class and split his head. The wound required a staple to close.
- Marguerite put popcorn kernels in her ear, which had to be surgically removed.
- Reid put his thumb between a wagon handle and the side of the building, where it was smashed. He was taken to the pediatrician, but it was not broken.
- Abigail fell and hit the corner of a table in class, sustaining a two-inch deep laceration. This wound required twenty stitches to close.

It is interesting to note the variation in response to these injuries. Colleagues that the authors spoke with during the course of this study were not surprised at the number of incidents which occurred during transition between classes. However, they were surprised that so few incidents occurred on AP. There is a common perception that adventure playgrounds are unregulated, unsupervised places where injuries happen often. When injuries have occurred there, AP staff were required to provide full explanations and justifications for their approach. Injuries during the school day were



framed as freak accidents, and no one has suggested removing the bathroom doors or ceasing the use of wagons.

## **Conclusion**

From this small sample, one can begin to question the assumption that playgrounds explicitly designed to remove risks lead to fewer injuries. One might investigate the other factors, such as the role of adults trained to understand play and risk. Or, it is possible that counterintuitively play equipment that is uneven, pointy, wobbly, irregular, and made by children themselves might cause children to act differently and thereby lead to fewer injuries. Playwork philosophy theorizes that both contribute. More study is required.

## Further Reading

*The following readings provide some context for adventure playgrounds and risk in children's play. They begin to answer why the above results might exist.*

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