Increases in Pediatric Sports Injuries Late in the COVID-19 Pandemic

Introduction
Since reaching a pandemic status in March 2020, COVID-19 has caused many public health policies to be put in place including social distancing, self-quarantining, and a variety of public closures. Importantly, this included schools, extracurricular activities, and organized sports. As sporting organizations attempt to ensure an adequate season, variations in weekly games and more condensed schedules could be contributing to increased risk of injuries.

This study aimed to examine the impact COVID-19 had on the incidence of pediatric sports related musculoskeletal injuries as public health measures changed. Our hypothesis was that sports injuries would increase in rates over the summer months as athletes began to train for their fall sports seasons following months of rest or unorganized training.

Materials and Methods
This is a retrospective cohort study of pediatric patients presenting for musculoskeletal injuries during the COVID-19 pandemic compared to previous years. The patients were sorted by date of initial presentation for care. The "Early" cohort consisted of patients presenting between March 15th and April 15th. The "Middle" cohort consisted of patients arriving between June 15th and July 15th, while the "Late" cohort consisted of patients arriving between August 15th and September 15th. Control groups consisted of patients presenting in similar time frames in the two previous years, 2018 and 2019.

Patients were included if they were between the ages of 5 and 18 when presenting to an orthopedic clinic office or the emergency room for one of the following acute injuries occurring as a result of sports: ACL injury, meniscus injury, patellar dislocation, shoulder dislocation, ankle ligament sprain, clavicle fracture, medial epicondyle fracture, tibial spine fracture, and stress fracture.

Variables were compared between the 2018-2019 and 2020 cohorts and the "Early", "Middle", and "Late" cohorts. Statistical significance was defined in this study with a threshold of p < 0.05. Chi squared and Fisher’s exact tests were used to compare categorical variables. Mann-Whitney U tests were used for continuous variables. Statistical analysis was performed using IBM SPSS Statistics for Macintosh, Version 24.0 (IBM Corp., Armonk, NY).

Results
A total of 1384 patients with the injuries of interest were reviewed with 643 (46.5%) occurring as a result of a sport-related injury. 506 of these patients presented in between 2018 and 2019, while 137 presented in 2020. Ankle sprains were the most common injury and accounted for 54.2% of all injuries, while tibial spine fractures represented 0.5% of injuries. Basketball was the single sport that contributed the most number of injuries with 126 (24.9%) in 2018-2019 and 40 (29.2%) in 2020 (p = 0.506). ACL injuries, meniscal injuries, patellar dislocations, medial epicondyle fractures, and stress fractures saw an increase in relative proportion of injuries in 2020 (p = 0.002).

A total of 227 patients were seen in the Early cohort (March 15th-April 15th) with 217 being seen between 2018-2019 and 15 being seen in 2020. 170 patients were seen in the Middle cohort (June 15th-July 15th) with 132 in 2018-2019 and 38 in 2020 and finally, 246 in the Late cohort (August 15th-September 15th) with 162 in 2018-2019 and 84 in 2020. 31 (14.6%) patients in the Early cohort required surgical intervention in 2018-2019, while only 2 (13.3%) underwent surgery in 2020 (p = 0.891). In the Middle cohort, surgical treatment was seen in 27 (20.5%) patients in 2018-2019 and 8 (21.1%) in 2020 (p = 0.936). Yet, in the Late cohort, 18 (11.1%) patients underwent surgery in 2018-2019, while 20 (23.8%) were treated surgically in 2020 (p = 0.009).

Discussion
As the world continues to adapt to the COVID-19 pandemic, schools, extracurriculars, and sports have all made various attempts to provide children with safe environments. This study examined sport-related injury trends presenting to a pediatric hospital during the COVID-19 pandemic and demonstrated significant changes in injury type. Previous studies have shown the effects of prolonged...
When looking specifically at sports injuries, this study found a 1.8-fold decrease in monthly sports injury volume during this time. In the early fall however, the relative proportion of sport injuries in 2020 increase and surpasses the proportion seen in previous years (Figure 1). COVID precautions during the early part of the pandemic led to many organized youth sports leagues being suspended causing our reported decrease in volume during the early spring and early summer.8,9

Table 2: Injury Characteristics and Management of Early (March, April), Middle (June-July), and Late (August-September) Patients in 2018-2019 versus 2020

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<td>3 (20)</td>
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<td>8 (6.1)</td>
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<td>Right</td>
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<td>66 (50)</td>
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<td>44 (52.4)</td>
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<td>Left</td>
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<td>Seen at Previous Institution</td>
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<td>20 (12.3)</td>
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<td>29 (17.9)</td>
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<td>12 (7.4)</td>
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<td>27 (20.5)</td>
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<td>13 (86.7)</td>
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<td>105 (79.5)</td>
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<td>144 (88.9)</td>
<td>64 (76.2)</td>
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†Mann-Whitney U

rest on sports injuries, but this study set out to understand sports injury progression during the COVID-19 pandemic, specifically. Understanding how this pandemic has already affected sports injuries in the pediatric population will be paramount in further understanding future sources of musculoskeletal injury for children.

Bram et al. demonstrated how pediatric fracture volume presenting to a single pediatric health system decreased by 2.5-fold during the peak of the COVID pandemic in March and April 2020.7 When looking specifically at sports injuries, this study found a 1.8-fold decrease in monthly sports injury volume during this time. In the early fall however, the relative proportion of sport injuries in 2020 increase and surpasses the proportion seen in previous years (Figure 1). COVID precautions during the early part of the pandemic led to many organized youth sports leagues being suspended causing our reported decrease in volume during the early spring and early summer.8,9
In the summer and fall of the pandemic, many fall sports including football and soccer were resuming in a variety of different capacities. As a result, we were able to show an increase of almost 13% in the rate of injuries requiring surgical intervention during the late summer and early fall of the pandemic relative to non-pandemic timeframe (Figure 2). With organized sports returning for a fall season in late August to early September, the statistically significant increase in surgical interventions during this interval suggest injuries to early September, the statistically significant increase in surgical interventions during this interval suggest injuries occurring while playing sports. As the COVID-19 pandemic continues, providers should be aware of the increased risk of significant injuries to their patients and counsel patients on gradual return to sport.

Conclusion

The COVID-19 pandemic has led to several changes in sporting events and extracurricular activities for the pediatric population. This retrospective study demonstrated an overall decrease in sport-related injuries during three different time intervals throughout the evolving COVID-19 pandemic. Furthermore, the proportion of injuries requiring surgical treatment between August 15th and September 15th 2020 increased compared to previous years suggesting a greater risk for significant injuries as patients are returning to organized sports. As the COVID-19 pandemic continues, providers should be aware of the increased risk of significant injuries to their patients and counsel patients on gradual return to sport.

References

10. RETURN TO PLAY PROTOCOLS. https://www.epysa.org/return-to-play-protocols/.