



Pediatric Fracture Patterns During COVID

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Purpose

To identify how pediatric fracture trends were altered by COVID-19 and associated stay-at-home (SAH)/shelter-in-place (SIP) orders

We also examined COVID-specific concerns:

- Delays in care
- Rates of non-accidental trauma (NAT)

Methods

We identified patients who presented to CHCO for definitive management of a fracture between March 26th and May 31st

- 2018
- 2019
- 2020

These dates were chosen based upon the start of statewide SAH orders in Colorado through the end of a standard public-school year.

Data collected:

- Demographics
- Injury mechanism/location
- Fracture characteristics
- Treatment
- Number of days from injury to definitive treatment

Results

A total of **1838** patients met criteria for inclusion

The number of fractures in 2020 during the COVID SAH orders decreased by **26%** relative to 2019 and **23%** relative to 2018

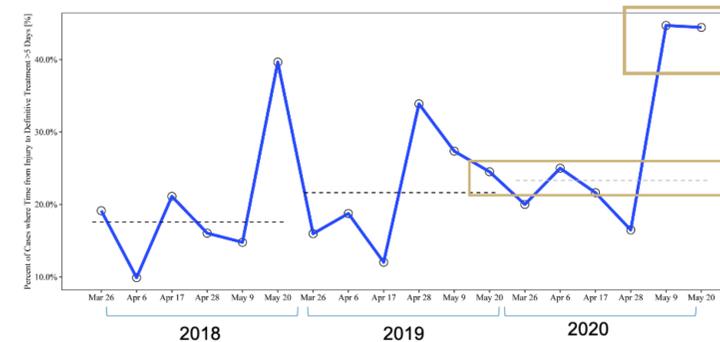
During COVID SAH orders in 2020:

1. Patients were significantly **younger** [p < 0.0001]
2. Injuries were more likely to occur at **home** and involve **trampolines, bikes, scooters or skateboards** [p < 0.0001]
3. There was a significant decrease in the odds of fracture occurring during an **organized sport** [p < 0.0001]
4. There was a significant increase in the proportion of patients who underwent definitive treatment **greater than 5 days after their initial injury**

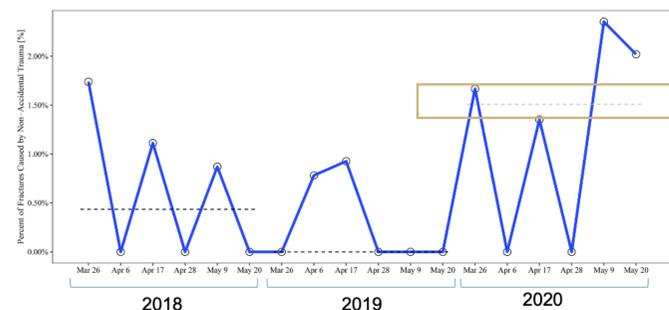
Age-related heterogeneity in location and severity of injuries

Contrast*	OR	LCL	UCL	P Value
Fracture Occurring at Home				
Odds of Home Fracture: 2-year-old	2.93	1.79	4.79	<.0001
Odds of Home Fracture: 10-year-old	7.14	5.52	9.23	<.0001
Odds of Home Fracture: 16-year-old	13.93	8.52	22.78	<.0001
Fracture Involving Bike/Scooter Mechanism of injury				
Odds of Bike Fracture: 2-year-old	1.56	0.74	3.25	0.2402
Odds of Bike Fracture: 10-year-old	4.07	3.10	5.34	<.0001
Odds of Bike Fracture: 16-year-old	8.38	4.84	14.52	<.0001
Fracture Requiring Reduction				
Odds of Surgery: 2-year-old	0.47	0.20	1.10	0.0811
Odds of Surgery: 10-year-old	1.08	0.72	1.62	0.7261
Odds of Surgery: 16-year-old	2.00	1.04	3.88	0.0390

*Odds ratios (OR) interpreted as change in odds of the exposure variable (location, mechanism, or need for surgery) during 2020 relative to odds of exposure variable during the control years for a subject of a given age (2-year-old, 10-year-old, or 16-year-old). Odds ratios demonstrate greater effect of 2020 on older subjects relative to younger subjects.



A meta-analysis was used to combine our results with those of a similar study (Kovler et. al), and the overall effect revealed a **strong increase in the occurrence of NAT during the 2020 SAH period** [p < 0.0001]



Study	COVID Events	COVID Total	Control Events	Control Total	Odds Ratio	OR	95%-CI	Weight
Kovler et al. 2020	8	60	7	197		4.11	[1.47; 11.50]	53.0%
Current Study 2020	6	503	6	1335		2.67	[0.90; 7.96]	47.0%
Random effects model		563		1532		3.36	[1.59; 7.10]	100.0%

Heterogeneity: p = 0.57
Test for overall effect: p < 0.01

Conclusions

Despite overall lower rates of trauma during the SAH/SIP orders in 2020:

- Greater fracture numbers were seen among **younger children**
- **Older children** were more likely to suffer an **injury requiring more aggressive treatment**
- Greater numbers of fractures were seen resulting from **higher-energy mechanisms such as trampoline, scooter, skateboard, and bicycle accidents**
- A higher percentage of patients had **more than a 5-day delay from injury to definitive care**
- There are strong indications that **instances of NAT have become increasingly prevalent**

Implications

Orthopedic treatment centers should:

- **Educate** patients and guardians
- Be prepared to treat **higher-energy injuries**
- Anticipate **delays in care**
- Consider the possibility of **non-accidental trauma**