# Burn visits to a pediatric burn center during the COVID-19 pandemic and 'Stay at home' period

*Dear Sir*

Unintentional burns are a leading cause of injury related deaths in young children. Burn visits to the pediatric Emergency Department (ED) pose a significant financial burden on the health care system [1,2]. Low socioeconomic status, young age, parental education, and overcrowding are known risk factors for burns [3]. Our tertiary care pediatric hospital is a burn referral center for our state with historically 600 ED visits and 300 admissions for burn care each year. The COVID-19 pandemic resulted in school and daycare center closures in our state for nearly 10 weeks. We studied the impact of the Stay at Home (SHO) executive order during the COVID-19 pandemic on burn visits in children at our institution.

We analyzed all burn visits to our center by children $\leq$ 21 years of age between March 16th 2020 and June 3rd 2020 when schools were closed and the "Stay at Home order" (SHO) was executed, and compared this to the same period in 2019 (non SHO). We also collected data on the total number of overall ED visits during the two study periods.

We found a 66.6% reduction in overall ED visits (SHO: 7871 vs non SHO: 23,521) and a 35% reduction in burn visits (SHO: 74 vs non SHO: 114) during SHO period. However, similar to a previous report [4], burn visits contributed to a higher proportion of total ED visits during SHO compared to non SHO (0.94% vs 0.48%, 95% CI: 0.2 to 0.7). We speculate that this increase might have been secondary to closure of most pediatrician offices for direct in-person visits resulting in children presenting to the ED for even minor burns. We found no difference in the mean age between the two study periods (5.3 $\pm$ 4.8 vs 4.3 years $\pm$ 4.2; difference: 1, 95% CI: 0.3 to -2.3). Scald burns were the most common type of injury during both study periods. However, house fires proportion was significantly higher (16.2% vs 3.5%, 95% CI: 2.9–19.9) during SHO compared to the non SHO period. Although the exact reasons for observed increase in house fires are unclear, potential reasons include loss of social connections and family support, stress of working from home, and lack of structured child care environments with reduced supervision of children. However, further long term studies are indicated to confirm this increase in house fire related burn visits and explore the reasons for the same. The severity of burns was higher during the lockdown as evidenced by an increase in burn alerts (14.8% vs 2.6%, 95% CI: 0.74–17.33), total body surface area (TBSA) burned (2 $\pm$ 3.7 vs 3.5 $\pm$ 5.5, 95% CI: 0.13–2.86), proportion of children with $>$ 5% TBSA (4.3% vs 13%, 95% CI: 1.09–19.11) and intensive care unit admissions (9.4% v 0.9%, 95% CI: 2.38–17.44). We had one death due to house fire related injury during the SHO period.

Since the majority of pediatric burns occur in the home environment, it may be useful to review fire safety plans with families before any future lockdowns. Parents should be reminded to keep children away from hot liquids and surfaces, installation of a smoke alarms on each level of the house, teaching children to "stop, drop and roll", and practicing a family evacuation plan.

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## Contributors

All authors participated in the design of the study. Authors US, AS, LV, CB, DC and NK were involved in data acquisition, statistical analysis and manuscript writing and revisions. Authors US, AS and NK were also involved in data interpretation. Authors CS, LD, JK were involved in study design, data interpretation, writing and critical revisions of the manuscript.

## Declaration of conflicts of interest

All authors declare that there are no conflicts of interests

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# Letter to the Editor: Fractional CO2 laser ablation of porcine burn scars after grafting

*Dear Professor Wolf,*

We read with great interest the recent article assessing the ablation depth on scar outcomes in a porcine model for burn scars post grafting by Baumann et al. [1].

Over the past decade various groups have reported substantial clinical improvements of burn scars following fractional resurfacing [2–5]. However, limited evidence is extant regarding which treatment settings are associated with superior outcomes. Thus, we congratulate Baumann et al. who sought to address the enigma of what settings should be used for fractional laser resurfacing of burn scars and systematically assessed the efficacy of different pulse energies in a porcine model. In their study, three cycles of ablative fractional CO2 laser therapy with 4 weeks intervals were initiated on day 28 after split-thickness skin grafting of an excised full-thickness burn wound on the dorsum of red Duroc pigs; their previous study indicated that graft contraction is significantly reduced if laser therapy is initiated after complete wound closure on day 28 [6]. The scar was treated with pulse energies of either 20, 70, or 150 mJ, at a 5% density or left untreated as a control. Various outcomes were evaluated prior to each laser treatment and at several time points following treatment, revealing little difference in outcomes for different laser energies.

Our group has been treating burn scars with ablative fractional CO2 laser for 6 years. As we previously published with human clinical studies, we agree with the authors that early intervention with the ablative fractional $CO_2$ laser positively influences scar maturation and rehabilitation, may even prevent further surgical reconstructive procedures, and can be initiated as early as skin epithelialisation has occurred [7,8]. The authors also correctly stated that aside of the delivery parameters, timing of treatment initiation, optimal treatment interval, and the total number of treatments are relevant. However, we strongly believe that in people the choice of laser settings (penetration depth and densities) is heavily dependent on various individual parameters, such as scar location (skin thickness), skin colour, Fitzpatrick skin type and type of scar (healed by secondary intention, split-thickness skin graft, cultured epithelial autograft, etc.). Whilst the porcine model allows a platform to evaluate the contribution of individual scar outcome variables in a standardized way, pig skin, although sharing histological similarity to human skin, does not include these very relevant factors related to the choice of laser settings and scarring potential which are in our view closely related to patient outcomes. We further believe a porcine model does not allow evaluation of subjective outcomes such as scar pruritus, neuropathic pain, heat sensitivity, etc., which are also important to factor into the choice of treatment settings when assessing efficacy. In an attempt to evaluate all these outcomes with different laser settings, our group assessed whether laser penetration depth influences these clinical subjective and objective outcome parameters [9]. Seventy-eight patients with 158 scars, who received treatment with the ablative fractional $CO_2$ Ultrapulse® laser with laser facilitated steroid infiltration for hypertrophic burn scars were included in our analysis and the thickest point of their scar measured with ultrasound. As it is postulated that laser energy settings directly correlate with the depth of scar penetration, the maximum penetration depth was divided by the scar thickness at the thickest point of each scar to calculate the percentage of tissue penetration, and patients divided into five groups depending on scar penetration depth. Subsequently, the effect of various penetration depths on clinical outcome parameters including scar thickness, Vancouver Scar Scale (VSS), Patient and Observer Scar Assessment Scale (POSAS), questionnaires about neuropathic pain, pruritus and burn specific quality of life were evaluated. To further value the impact of natural scar maturation, the patient cohort was divided into an immature scar group (<2years after injury) and a mature scar group (>2years after injury). In summary, our analysis found that laser scar penetration depth significantly influences not only objective, but importantly also subjective