Flame Time of Cigarette Lighter Necessary to Achieve Temperature Capable of Inflicting Skin Burn
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Objective:
Cigarette lighters are frequent vectors in non-accidental contact burns. Time and temperature needed to cause thermal injury is often used to differentiate accidental from inflicted burns. This study examines the time needed to heat cigarette lighter metal to temperatures capable of inflicting skin burns.

Methods:
A literature search was performed to establish the time and temperature at which partial/full thickness skin burns are acquired, regardless of vector.
Using a Ray-tech heat gun, the temperature of the metal on two lighter brands was measured at ten second intervals while sustaining maximal flame and during cooling once the flame was extinguished.

Results:
In the literature, the lowest temperatures documented to cause burns in one second were 64°C-80°C for partial thickness burns and 60°C-98°C for full thickness burns. From an ambient temperature prior to flame ignition, it took at approximately 70 seconds for the lighter metal to reach 60°C. At a temperature of 80°C, the lighters were shut off. Both brands cooled to less than 60°C in less than 10 seconds.

Conclusion:
Cigarette lighter burns are often blamed on accidental occurrences. At least 70 seconds of sustained flame is needed to heat cigarette lighter metal to temperatures capable of inflicting partial or full thickness skin burns. This time is longer than the time required to light a cigarette. Furthermore, the lighter cools down quickly. Therefore, for a cigarette lighter to inflict a contact burn injury, there needs to be intent and preparation, making accidental cigarette lighter burns unlikely.

Key words: cigarette lighter, burn, skin, non-accidental injury