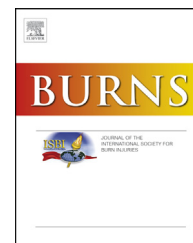


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Case report

Facial burns from exploding microwaved foods: Case series and review



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ABSTRACT

Introduction: Microwave ovens allow for quick and simple cooking. However, the importance of adequate food preparation, prior to microwave cooking, and the consequences of inadequate preparation are not well-known.

Method: The authors conducted a retrospective outcome analysis of all patients who sustained facial burns from microwaved foods and were treated at a UK regional burns unit over a six-year period. Patients were identified from clinical records.

Results: Eight patients presented following inadequate preparation of either tinned potatoes ($n = 4$) or eggs ($n = 4$). All patients sustained $<2\%$ total body surface area facial burns. Mean age was 41 years (range 21–68 years). Six cases (75%) had associated ocular injury. One received amniotic membrane grafts; this individual's vision remains poor twelve months after injury.

Discussion: Rapid dielectric heating of water within foods may produce high steam and vapour pressure gradients and cause explosive decompression [1,5,11]. Consumers may fail to recognise differential heating and simply cook foods for longer if they remain cool on the outer surface. Education on safe use and risks of microwave-cooked foods may help prevent these potentially serious injuries.

Conclusion: Microwave ovens have become ubiquitous. The authors recognise the need for improved public awareness of safe microwave cooking. Burns resulting from microwave-cooked foods may have life-changing consequences.

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1. Introduction

Cooking in microwave ovens is quick and simple. However, the risks associated with improper use of this household

device are poorly-understood. There is a well-recognised association between laryngeal and pharyngeal burns and microwave-heated foods [1–4]. We discuss eight cases of facial burns presenting to a UK regional burns unit, between 2008 and 2014, of which six were associated with ocular injury. All

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cases involved potatoes or eggs, cooked in microwave ovens without adequate preparation. Previous reports suggested that injuries of this type were from exploding microwaved eggs and resulted in superficial burns [5–7]. The authors aimed to establish whether any patterns of causation exist, illustrate what outcomes may be expected and determine any benefit for improved public information.

2. Methods

Patients who had sustained facial burns from microwaved foods were identified from burns clinical records. The authors carried out a retrospective analysis of patient case notes for those treated between January 2008 and December 2014. Data collected included patient demographics, mechanism of burn, site and severity of burn, treatment and clinical outcomes.

3. Results

Eight patients were assessed and treated over a six-year period, for facial scald injuries caused by exploding microwaved food [Table 1]. All but one patient were female (age range 21–68 years, mean age 41). In four cases, the causative food was unpierced canned potatoes that were boiled in the microwave and exploded on removing or upon piercing. In

four cases, eggs exploded on removing from the microwave or upon piercing.

Six cases (75%) had associated ocular injury, of which one patient had significant corneal injury with complete loss of epithelium in the right eye, receiving bilateral conformers and amniotic membrane grafts. This patient's visual acuity was poor twelve months after injury. One patient sustained a scald to the upper and lower lips and anterior soft palate, associated with mild lip and tongue swelling. There was no airway compromise. The areas affected by this type of injury are shown [Fig. 1].

All patients sustained less than 2% total body surface area (TBSA) burns. Six were less than 1% TBSA. Only two patients had any areas of deep partial thickness burn [Fig. 2a and b]. All patients were treated conservatively, with topical paraffin ointment and all patients healed well, without the need for skin grafting. Five out of six patients with ocular injury were managed conservatively and had no long-term visual dysfunction.

4. Discussion

Domestic microwave ovens operate at a power range of 500–1100 W and frequency of 2450 MHz [1]. Microwave energy produced within the oven is reflected by its metallic shell, which remains cool, but is absorbed by water molecules

Table 1 – Facial burns sustained from exploding microwaved foods – source, management and long-term outcome.

Age	Gender	Source	Injuries	Management	Outcomes
31	F	Un-pierced canned potatoes	1.5% TBSA scald burns - Forehead, cheeks, right lower eyelid and malar - Epithelial loss affecting bilateral conjunctiva. Complete loss of right corneal epithelium	Bilateral eye conformers and amniotic membrane grafts Conservative management of facial burns	Continues to be reviewed by ophthalmology 16 months later – 6/6 vision in each eye
68	F	Un-pierced canned potatoes	1.25% TBSA scald burns - Unilateral face and corneal abrasions	Conservative	No complications
26	F	Un-pierced canned potatoes	<0.5% TBSA scald burns - Forehead, nose, left cheek, shoulder and arm	Conservative	No complications
59	F	Un-pierced canned potatoes	PT burns to upper and lower lip mucosa and anterior soft palate	Conservative	No complications
21	F	Boiled egg	<1% superficial PT scald burns to forehead, nose and eyelids - Superficial corneal burns	Conservative	No complications
50	M	Poached egg	<1% superficial PT periorbital scald burn - 95% right corneal abrasion	Steroid, antimuscarinic and antibacterial eye drops Conservative management of facial burns	No complications
42	F	Poached egg	<1% superficial PT scald burns to right nostril and left neck - Superficial conjunctival burns	Conservative	No complications
28	F	Boiled egg	<1% superficial PT scald burns to right cheek, upper eyelid and right neck - Right eye corneal abrasion	Conservative	No complications

F, female; M, male; TBSA, total body surface area; PT, partial thickness.

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