

## **Review Article**

### **TIME TO ADDRESS TOTAL CONTACT CAST (TCC) AS INDIAN TCC**

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#### **ABSTRACT**

More than 100 years up since the time of discovery of insulin. Also, more than 80 years are up since the time total contact cast was first used to heal neuropathic plantar ulcer. Today, many consider total contact cast to be gold standard for treating diabetic foot ulcers. The author briefly describes about history of total contact cast and also the need for it to be addressed as Indian TCC henceforth.

*Keywords: Offloading, Ulcer, Foot, Cast*

#### **INTRODUCTION**

Diabetic foot ulcers are one among the most common and also devastating complications of diabetes mellitus that physicians and surgeons encounter in their practices [1]. It is estimated that by 2045, there will be 700 million people with diabetes [2]. The prevalence of diabetic foot ulcer is around 6.3% and around 1/3<sup>rd</sup> of patients with diabetes may suffer from foot ulcers in their lifetime [3]. More than half of these ulcers get infected leading to amputation [4].

Peripheral neuropathy, ischemia, trauma and foot deformities are considered to be risk factors for diabetic foot ulcer with neuropathy being the commonest [4, 5, 6].

Offloading is considered to be a primary treatment for non-complicated neuropathic plantar ulcers [7]. Total contact cast (TCC) is for decades being considered to be a gold standard to offload plantar ulcer [8, 9]. Studies

have shown TCC (Figure 1) to be effective in healing plantar ulcer ranging from 73% to 100% [10]. TCC promotes healing of ulcer by reducing the load over high pressure area over the foot [11]. TCC is known to decrease walking velocity in patients and also shorten stride length [12]. There are also many other factors that contributes to the effectiveness of the TCC [13].



Figure 1 showing TCC application

### **HISTORY OF TOTAL CONTACT CAST**

Majority of the published literature states that TCC was originally described by Dr Joseph Khan [14]. According to published literature by Bhakat et al [15], Wertsch et al [11], Rai et al [14], etc, the earliest published report of casting in trophic ulcer dated back to 1930's where Dr Joseph Khan from India described its use in leprosy. It was well known that results of trophic ulcer were poor till immobilization of patients in plaster, as shown by Joseph Khan, became standard of treatment [16]. He had suggested the ambulatory method to treat plantar ulcers in leprosy as an alternative to bed rest in hospital which was prolonged and expensive method [15].

However, few published report states that plaster casting for treatment of neuropathic foot was first described by Milroy Paul [17]. Greenhagen et al [18] credits both Joseph Khan and Milroy Paul from Ceylon, India to have utilized the casting in Hansen disease. However, Greenhagen et al stated that Joseph Khan published his technique and case series on TCC in 1939 which is in Lepr India. Most of the other authors also gave the reference of same in their publication [11, 14, 15].

The author also observed other few mish mash ups occurring with history of TCC. One such is stating that TCC was described by Khan in leprosy in Srilanka (Known then as Ceylon) [18]. Joseph Khan was not from Sri-Lanka but from India [14, 15].

Years later, Dr Paul Brand pioneered the method of total contact cast while working in India in 1950's on leprosy patients [19]. Dr Brand was attached to Christian Medical College, Vellore in India and was involved in management of leprosy patients [9]. He was invited in 1946 by Robert Cochrane to teach at Christian Medical College where Dr Brand started to research on leprosy patients [20]. Later, Dr Paul Brand moved to Louisiana and there he introduced TCC and other Offloading in USA. What he was doing in leprosy patient in Vellore, India, he did it in Carville in USA in patients with diabetes [10, 19, 21, 22].

Over years distinct variety and modifications of TCC were seen and includes Instant TCC (i-TCC), TCC- EZ and Custom TCC (C-TCC) [18, 23, 24, 25]. Armstrong was the first to use the term instant total contact cast (i-TCC) in 2002 [23]. The term i-TCC is well used in literature. TCC-EZ is another viable modification to TCC [24]. It is a ready to use TCC as it is a single roll on; light weight woven fiberglass cast socks [25]. C-TCC (custom total contact cast) was designed to better address frontal plane biomechanical deformity [18].

All the above TCC modifications are named. The author reviewed the literature and concluded that most work of the earlier original TCC was done in India. Hence, it needs to be toponym based on the place of its origin and work done by different experts there and thus the TCC should henceforth be known as Indian total contact cast. The author could not give a particular medical eponym in view of multiple expert's name being involved on TCC with a bit of mish mashup in literature.

## **CONCLUSION**

Total contact cast (TCC) is now commonly used offloading modality in different parts of the world in healing plantar neuropathic ulcers in diabetes and also other conditions like Charcot foot. Distinct new modification has taken place in TCC. The author believes that with i-TCC, TCC-EZ & C-TCC are being commonly addressed TCC modifications and are well accepted by most. The author felt that that it was high time that the

total contact cast itself be readdressed as Indian TCC in view of extensive work done on TCC decades ago on leprosy patients in Indian subcontinent by different experts.

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**CONSENT (WHERE EVER APPLICABLE)**

Not applicable

**ETHICAL APPROVAL (WHERE EVER APPLICABLE)**

Not applicable

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