

## Usage of Therapeutic Offloading In Diabetic Foot- A Clinical Audit

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Author Details
Amit Kumar C Jain* and Apoorva HC
Authors Affiliations
Amit Jain's Diabetic Foot Offloading Clinic, Amit Jain's Institute of Diabetic Foot & Wound Care, Brindhavvan Areion Hospital, Bengaluru, India
Corresponding Author*
<b>Amit Kumar C Jain</b>
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**Abstract:** *Aim-* To assess the usage of therapeutic offloading in diabetic foot patients in an expert diabetic foot centre and distribute them according to Amit Jain's classification for offloading. *Methods and materials-* A retrospective audit was conducted at Amit Jain's diabetic foot offloading clinic which is now an eponymous wing under Amit Jain's Institute of Diabetic Foot and Wound Care, Brindhavvan Areion Hospital, Bengaluru, Karnataka, India. The audit was over one year period from July 2019 to June 2020. *Results* – There were 34 patients in whom offloading was used during this period. Majority was males (58.82%). 88.24% of patients had diabetic foot ulcer for which offloading was used. Majority of the patients (82.35%) received simple off loadings and Amit Jain's offloading system was the commonest offloading method used at our centre. Only 5.88% of patients had total contact cast. *Conclusion-* Offloading is an important strategy in treatment of diabetic foot. Audit from our expert diabetic foot centre, which has dedicated offloading clinic, shows that majority of patients receive simple offloading which is easy to apply and well accepted by the patients and complicated offloading are only occasionally required.

**Keywords:** Offloading, Simple, Amit Jain's, Felted foam, Footwear, Total contact cast.

## INTRODUCTION

Diabetes is considered to be a global epidemic adding huge burden on healthcare system around the world (Marzoq, A. *et al.*, 2019; Tindong, M. *et al.*, 2018). It is stated that by Year 2040, there will be around 642 million people affected with diabetes (Tindong, M. *et al.*, 2018). One of the most common, costly complications of diabetes is diabetic foot and it is responsible for 50% of diabetic related hospitalization admissions (Marzoq, A. *et al.*, 2019; Rizk, M, N., & Ameen, A, I, 2013).

Diabetic foot is a triad of neuropathy, infection and ischemia (Rizk, M, N., & Ameen, A, I, 2013; Ngim, N, E. *et al.*, 2012). Diabetic foot ulcers can affect 15-25% of people in their lifetime (Marzoq, A. *et al.*, 2019; Singh, S. *et al.*, 2013). Often, it is noted that mechanical trauma is one of the cause of diabetic foot ulcer (Raspovic, A., & Landorf, K, B, 2014). Hence in order to relieve the pressure on foot and achieve good healing rate, offloading is the key to plantar ulcer management (Nube, V, L. *et al.*, 2006). There are numerous offloading methods used for diabetic foot ulcers (Raspovic, A., & Landorf, K, B, 2014; Nube, V, L. *et al.*, 2006).

We thus conducted a retrospective 1 year audit on therapeutic offloading usage for diabetic foot problems.

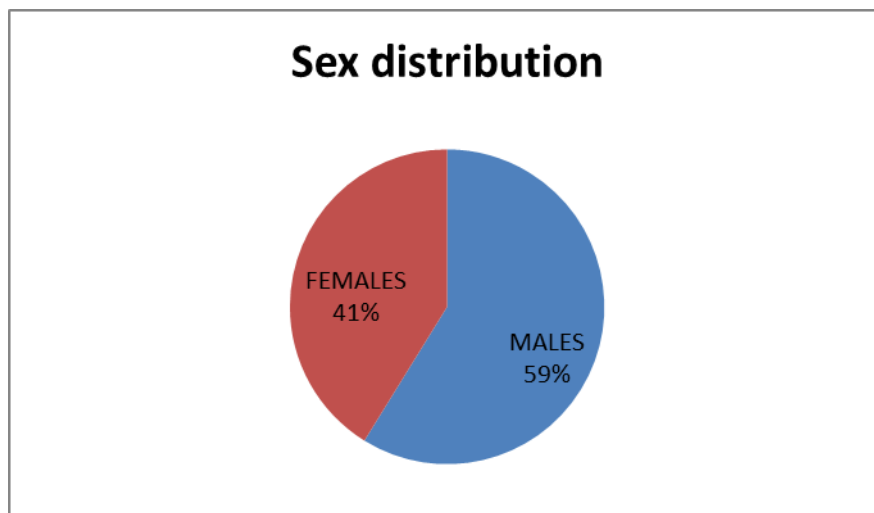
## METHODS AND MATERIALS

A retrospective audit was conducted at Amit Jain's diabetic foot offloading clinic which is a wing under Amit Jain's Institute of Diabetic Foot and Wound Care, Brindhavvan Areion Hospital, Bengaluru, India. This clinic functions regularly, twice a week, at our centre wherein dedicated offloading services are offered for diabetic foot patients. The audit period was from July 2019 to June 2020. All the diabetic foot patients to whom new primary therapeutic offloading was prescribed by our team were included. Patients on preexisting offloading devices prescribed elsewhere and came for consultation at our institute were excluded. Prophylactic off loadings was also excluded.

## RESULTS

A total of 34 patients had received offloading during the study period. 20 were males (58.82%) and 14 were

females (41.18%)(Figure 1). The average age of males was 52.4 years and females were 49.7 years. 9 patients (26.47%) had diabetes of less than 10 years and 25 patients (73.53%) had diabetes of more than 10 years duration.



**Figure 1.** showing sex distribution

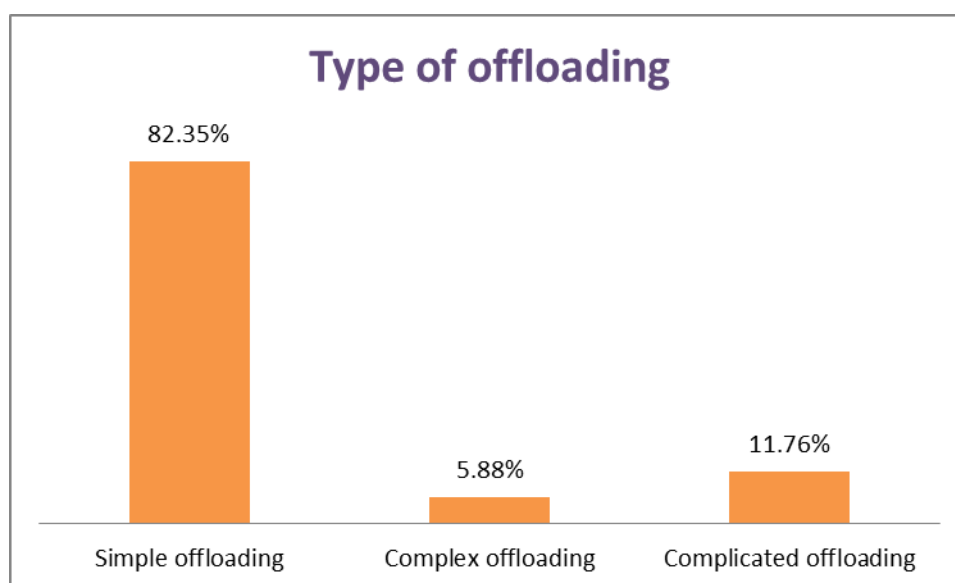
30 patients (88.24%) received offloading for diabetic foot ulcer (plantar) and 4 patients (11.76%) received offloading (Table 1) for Charcot foot (with and without ulcer).

**Table 1.** showing common diabetic foot pathology for which offloading was used

Sl no	Pathology	Number	Percentage
1]	Diabetic foot ulcer	30	88.24%
2]	Charcot foot	4	11.76%
	Total	34	100%

28 patients (93.33%) out of 30 had forefoot ulcers, 2 patient (6.66 %) had hind foot ulcers. 2 patients with Charcot foot also had associated midsole ulcer and were included in Charcot foot. Majority of patients (28

patients) received simple offloading (82.35%). 2 patients (Figure 2) received complex offloading (5.88%) and 4 patients (11.76%) received complicated offloading (Table 2).



**Figure 2.** showing offloading distribution as per Amit Jain's classification for offloading

**Table 2.** showing the distribution of offloading according to Amit Jain's SCC classification for offloading

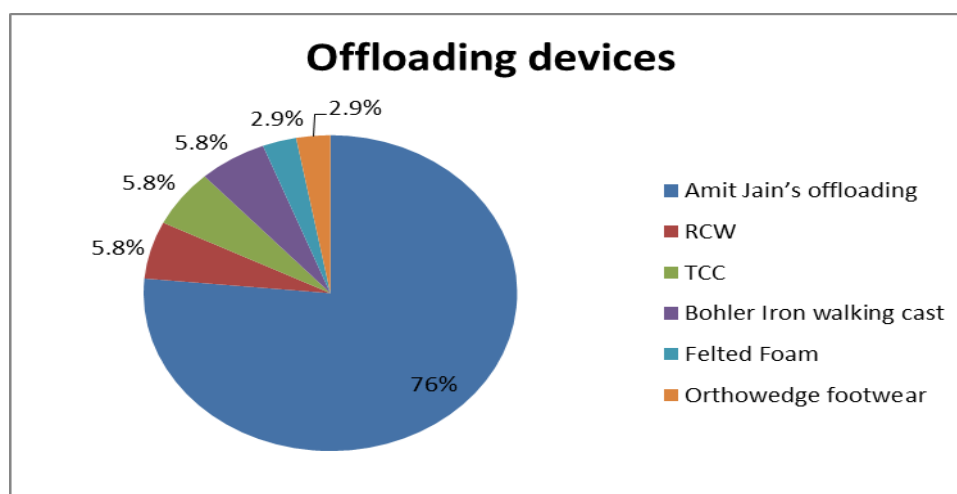
Sl no	Type of offloading	Number	Percentage
1]	Simple offloading (Type 1)	28	82.35%
2]	Complex offloading (Type 2)	2	5.88%
3]	Complicated offloading (Type 3)	4	11.76%
	Total	34	100%

Amit Jain's offloading system was the most common offloading used in 26 patients (76.47%). 2 patients (5.88%) received removable cast walker (air

cast), total contact cast and Bohler Iron walking cast each (Table 3). 2.94% patient received felted foam and anterior ortho-wedge each (Figure 3).

**Table 3** showing the common offloading devices used

Sl no	Type of offloading devices	Number	Percentage
1]	Amit Jain's offloading	26	76.47%
2]	RCW	2	5.88%
3]	TCC	2	5.88%
4]	Bohler Iron walking cast	2	5.88%
5]	Felted Foam	1	2.94%
6]	Orthowedge footwear	1	2.94%
	Total	34	100%

**Figure 3.** showing distribution of the offloading devices

## DISCUSSION

Offloading is one of the essential components in diabetic foot management especially for ulcers (Fife, C, E. *et al.*, 2014). There is wide variety of offloading methods and they include felted foam, removable cast walker, half shoes, Amit Jain's offloading system, CROW, Total contact cast, etc (Jain, A, 2018).

Total contact cast (TCC) was considered to be gold standard and is still considered by many for offloading (Armstrong, D, G. *et al.*, 2001; Wu, S, C. *et al.*, 2008). Even the recent IWGDF guidelines recommended TCC to be the first choice of offloading for neuropathic foot ulcers (Jarl, G. *et al.*, 2020). However, in spite of total contact cast being most effective offloading, it is

seldom used at most places for many reasons that include expertise requirement, cost, interference with mobility, not recommended in infected wounds and ischemia, etc (Jain, A, 2018 ; Saikia, P. *et al.*, 2016).

Even in western developed countries, less than 2% of practitioners used TCC and around 58.1 % did not consider TCC as the gold standard (Wu, S, C. *et al.*, 2008). TCC was used at our diabetic foot centre in only 5.88% of cases (Figure 4). It is noticed that there are now numerous variety of offloading available today and different parts of the world used different offloading modality. We choose simple off loadings as our first choice and TCC as last resort in diabetic foot ulcer. However, TCC is our first choice in acute Charcot foot.



**Figure 4** showing total contact cast being applied

A study by Raspovic et al showed that felted foam was the most commonly used offloading in almost 94% of forefoot ulcers (Raspovic, A., & Landorf, K. B, 2014). Saikia et al study shows Bohler Iron plantar cast to be the primary modality of offloading diabetic foot ulcers in their hospital (Saikia, P. *et al.*, 2016). In our study, Amit Jain's offloading system was most commonly used offloading method used in 76.47% of the case. This offloading was developed by the author and was found to be effective in healing diabetic foot ulcers (Jain, A, K, C, 2017a; Jain, A, K, C. *et al.*, 2017) and since then it has been our first choice of offloading in clinical practice. A recent study showed that 94% of neuropathic plantar ulcers healed by 8 weeks with Amit Jain's offloading system (Jain, A, K, C. *et al.*, 2020). Amit Jain's offloading system is a simple offloading which is an alternative to felted foam whereas total contact cast or Bohler Iron walking cast are complicated offloading as per the new Amit Jain's classification for offloading (Jain, A, K, C, 2017a; Jain, A, K, C, 2017b).

## CONCLUSION

In today's modern world where technology is progressing faster, there are numerous offloading available for wound care and different countries may have different types of offloading available easily. One should used offloading judiciously based on patient's wound status, apart from its ease of application, acceptability and effectiveness. Our audit from an expert diabetic foot centre, that has a dedicated offloading clinic that uses almost all offloading system available, shows that most patients are on simple offloading and complicated off loadings like total contact cast are less commonly used.

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