



E-ISSN: 2616-3470  
P-ISSN: 2616-3462  
© Surgery Science  
www.surgeryscience.com  
2018; 2(2): 8-10  
Received: 25-02-2018  
Accepted: 26-03-2018

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## Amit Jain's classification for diabetic foot complications: The universal classification supreme

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### Abstract

Diabetic foot can be considered as an enigma in view of its complexity. Various attempts have been made over decades to give a best classification for diabetic foot. The popular classifications for diabetic foot are Wagner's classification and its derivative, the University of Texas classification. Many researchers and consensus have often recommended them without realizing that these classifications aimed for ulcers. Amit Jain's classification for diabetic foot complication is the new simple, easy and supreme classification that has for the first time included all the lesions in diabetic foot thereby rendering it a complete and a universal classification for diabetic foot.

**Keywords:** Diabetic foot, Classification, Wagner's, Amit Jain, India

### Introduction

The burden of diabetes and its complications has been increasing tremendously worldwide. Of all the complications, diabetic foot is considered to be a debilitating complication as it affects the patients both financially and socially thereby affecting his quality of life [1, 2]. It is estimated that around 2% of all diabetic patients will develop an ulcer annually and around 15% of them carry risk of diabetic foot ulcer during their lifetime [3]. It is also well known that there is difference in diabetic foot problems in Asian and Caucasian population [4, 5].

Diabetic foot is often neglected in developing and underdeveloped countries [5]. In spite of knowing the differences, it is observed that most concepts on diabetic foot are taken from the west and are followed in the eastern region blindly without analyzing much on the differences in diabetic foot problems in these regions.

In past few years, we have seen a tremendous development in various new concepts in diabetic foot. The biggest development is the Amit Jain's Principle and Practice of diabetic foot, the new modern diabetic foot surgery proposed by Amit Jain, a pioneering diabetic foot surgeon from Indian subcontinent [5, 6, 7]. The new system of practice of diabetic foot by Amit Jain, who is considered to be a Father of this new modern Diabetic foot surgery, consist of various new concepts that has changed the perception of how diabetic foot should be understood and managed.

This article aims to discuss the Amit Jain's classification for diabetic foot, the new universal classification that is today the classification supreme in diabetic foot [2, 5, 8].

### Amit Jain's classification for diabetic foot

For decades and even now in many regions, diabetic foot is often studied by Wagner's classification [8, 9]. Another common classification is University of Texas classification [8, 9], which many consider as a modified Wagner's classification [10]. Both these classification are for diabetic foot ulcer and it has been seen that most often they are confused and mistook to be classification for diabetic foot on whole by many [11].

In the year 2012, Amit Jain, a pioneering diabetic foot surgeon from Indian subcontinent, proposed the first new classification on diabetic foot complication that encompassed most lesions seen in diabetic foot around the world, which the previous popular and validated classifications in the west did not do it [8, 9, 12].

This simple classification divides the diabetic foot complications on whole into 3 types namely [Table 1], Type 1, Type 2 and type 3 diabetic foot complications [6, 8].

Type 1 diabetic foot complications are infective complications seen in foot and include abscess [Figure 1], Cellulitis, wet gangrene, tinea pedis, necrotizing fasciitis [Figure 2], etc.

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Type 2 diabetic foot complications include all non-infective complications like trophic ulcers, claw toe, charcot foot, dry gangrene, hammer toe, ischemic ulcer, etc

Type 3 diabetic foot complications are mixed in nature wherein the type 2 diabetic foot complications get infected. Best example in this category is a trophic ulcer with osteomyelitis.

Amit Jain's classification for diabetic foot complication is an open, modern, comprehensive classification for diabetic foot which can also include new lesions that can occur in future in diabetic foot [12, 13]. This 3 tier simple, easy, practical classification, that includes most lesions in diabetic foot around the world, should now be considered to be a universal classification in view of it being classification supreme [12, 14].

It is now well known that there is a difference between a classification that is descriptive in nature and a scoring which is numerical in nature and that gives a better idea of severity/outcome, like healing or amputation [15]. It is often noticed that many researchers/ reviewers/ consensus/ committees have mixed these 2 entities frequently in search of an ideal classification on diabetic foot.

An important property of diabetic foot is the triad namely, neuropathy, ischemia and infection [16]. Amit Jain's classification addresses them uniquely and efficiently. The infections like abscess, necrotizing fasciitis, etc are included. The neuropathic complication like trophic ulcer, charcot foot, hammer toe, etc are also addressed and the ischemic complications like dry gangrene and ischemic ulcers are also included in this classification.

Various studies done on this classification shows that type 1 diabetic foot complications are the most common cause of hospitalization in tertiary care hospital [2, 3, 13, 17] ranging from 60% -91% in different series. In Singh *et al* series [13], wet gangrene was the most common pathological lesion accounting for 33.98% of cases. In a recent series of the author and team also [2], it was seen that type 1 diabetic foot complications was the most common cause of hospitalization and wet gangrene was the common pathological lesion seen and it was found to be statistically significant [P, 0. 001].

One should understand that there is a geographic variation in occurrence of the lesions in the foot. Further, it is also well known that the physician's see early lesion compared to the surgeon's. So it is obvious that physician is likely to see type 1 diabetic foot complication like tinea pedis and cellulitis and type 2 complications like trophic ulcer, toe deformities etc more frequently and they will be managing them on their own. A surgeon often gets to deal with operative complications like abscess, wet gangrene, necrotizing fasciitis etc and they often need hospitalization.

Studies from India also have shown that the major amputation most commonly is seen in type 1 diabetic foot complications [18, 19]. In Kalaivani *et al* series [19], 85.7% of all major amputation has type 1 diabetic foot complication. Even in recent series of Jain *et al* [2], it was seen that most major amputation were performed in patients with type 1 diabetic foot complications. It was also seen that most stump complication following major amputation [78.6%] occurred in patients with type 1 diabetic foot complication [7]. It was also seen that majority of mortality [78.38%] occurring in diabetic foot were seen in patients with type 1 diabetic foot complication [20]. Even in a salvage series by Jain *et al* [21], it was seen that 76% of patients who underwent transmetatarsal amputation, had type 1 diabetic foot complication.

Amit Jain's classification revolutionized the approach towards

Diabetic foot and made one look beyond ulcers which was the focus of almost all previous classifications like Wagner's, University of Texas, PEDIS, etc [5, 8, 9]. Most Researchers and consensus committee's often focused and discussed merits and demerits of diabetic foot classification without even observing the fact that most of them were either focal classification or incomplete classification [12]. It is also seen that many researchers are biased with their choice of classification rather than looking at what is needed for the community. For example, Nather *et al*. [22] opines on adopting Wagner's and king's classification and provides treatment guidelines. In reality, King's classification is not followed in most zones. Further, it is now an incomplete classification and also it does not have sequential progressive staging. Nather *et al* [22] expects a classification to give follow-up action which no descriptive diabetic foot classification can give and further it is an undesirable property of any classification system. Often many such unrealistic expectations from classification leads to confusion on understanding which is the best classification system and like these different expectations from different researchers/ reviewer's/ consensus group's, it was observed that for decades no universal classification for diabetic foot was developed.

Today, there is good understanding of type of classifications for diabetic foot classification and also the difference between universal classification and ideal classification for diabetic foot [12]. Often these 2 were mixed up. With significantly important advantages, Amit Jain's simple classification for diabetic foot classification is the only classification that can be considered as a universal classification. The broader the classification with many lesions that has varied spectrum of involvement and with varied severity, it is virtually impossible for a single classification to give treatment guidelines for each such lesion.

#### **Law of classification [5]**

Amit Jain's law of classification states that "Diabetic foot, a complex disease, is multi-factorial, multi-pathological, multi-anatomical with multi-level involvement and multi-systemic complications requiring multi-disciplinary involvement. Hence, it is impossible for a single classification for diabetic foot to predict the outcome in each and every patient and to guide specific treatment for each patient using a single classification that encompasses many lesions in diabetic foot".

The Amit Jain's law for classification shall henceforth stop researchers/ reviewers/ consensus group from looking for a perfect or an ideal classification for diabetic foot on whole that addresses every issue raised and that can fulfill their unrealistic expectation from each classification. Rather combination of classification should henceforth be encouraged in future [5].

#### **Conclusion**

Amit Jain's classification is the simplest classification laid till date on diabetic foot. It is a 3 tier modern classification which is easy, practical, original and a complete classification that includes the common lesions seen in diabetic foot around the world. This descriptive classification can undoubtedly and undeniably be the universal classification for diabetic foot which also serves as an excellent teaching tool to disseminate the knowledge of diabetic foot across the globe. After decades, a universal classification supreme has been proposed and it's high time that it's followed worldwide by all consensus groups and societies unbiasedly owing all its merits and demerits keeping the Amit Jain's law of classification in the mind.

## Tables

**Table 1:** Showing Amit Jain's classification of diabetic foot complications

SI No	Types of Diabetic Foot Complication	Lesions
1]	type 1 diabetic foot complication	wet Gangrene, Cellulitis, abscess, necrotizing fasciitis, Etc
2]	type 2 diabetic foot complication	trophic ulcer, hammer Toe, claw toes, ischemic ULcER, charcot foot, dry gangrene, Etc
3]	Type 3 diabetic foot complication	EX – non healing ulcer with osteomyelitis

## Figure Legends



**Fig 1:** showing abscess over left foot. This is Amit Jain's type 1 diabetic foot complication



**Fig 2:** showing necrotizing fasciitis. This is also Amit Jain's type 1 diabetic foot complication

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