

## The Pathogenesis of Diabetes Neuropathy – An Update

Chair: *Paul Gyles*

### Identifying, Diagnosing and Treating Patients with Monogenic Diabetes: The Personalized Diabetes Medicine Programme

*Toni Pollin*

Approximately 1–2% of all cases of diabetes mellitus, amounting to several million cases worldwide, result from a change in a single gene and are known as monogenic diabetes, most notably maturity onset diabetes of the young, or MODY. Most cases are misdiagnosed as either Type 1 or Type 2 diabetes, including 95% of those in the United States of America. Correct diagnosis often enables patients to switch from insulin injections to oral sulfonylureas or even no treatment without loss of and often improved glycaemic control. The Personalized Diabetes Medicine Programme (PDMP) is part of the National Institutes of Health (NIH)-funded IGNITE (Implementing Genomics in Practice) Network and is designed to implement, disseminate and evaluate (including from a payer perspective) a sustainable approach to detection, diagnosis and individualized therapy for monogenic diabetes. Through diabetes centres at one academic and three non-academic sites, patients are screened for the indicators of possible monogenic diabetes using a questionnaire and standard laboratory tests (diabetes autoantibodies to rule out an autoimmune aetiology and C-peptide as a measure of endogenous insulin production) and/or on the basis of clinical suspicion. Those patients screening positive are further evaluated using family and medical history collected by a genetic counsellor. Patients with a high likelihood of having a monogenic form of diabetes are sequenced for the coding regions of 40 genes implicated in MODY and other monogenic forms of syndromic and non-syndromic diabetes using next generation sequencing. Of 65 individuals tested, five individuals (8%) were found to have confirmed monogenic diabetes, including three with mutations in *GCK* causing MODY2, indicating no treatment was needed, and one with a mutation in *HNF1A* causing MODY3, indicating that low-dose sulfonylurea treatment was optimal, and one found to have diabetes resulting from an insulin gene structural mutation (MODY10). Recruitment is ongoing in this demonstration of the importance to clinical care of identifying a patient's specific diabetes subtype.

### The Use of Cannabinoids in the Nutritional Management of Diabetic Neuropathy

*Marsha Woolery*

Nutrition is one of the four tenets in the effective management of diabetes mellitus. Making healthy food choices has been proven to lower blood glucose levels and reduce the risk of developing the long-term complications of diabetes mellitus such as diabetic neuropathy and hence improve the quality of life.

Over the past twenty years, there has been a resurgence of interest by researchers/ scientists in exploring the use of Cannabis – ‘marijuana’, ‘ganja’, ‘Mary Jane’, ‘weed’ – in healing the illnesses of the world. There is emerging evidence that cannabinoids such as cannabidiol (CBD) have a positive effect on lowering blood glucose levels, preventing inflammation, relieving pain associated with neuropathy, improving circulation of blood, weight management and reducing waist circumference.

Is there really a place for cannabinoids in the diet of persons with diabetes mellitus? Most times when persons think about cannabis, the thought that comes to mind is to smoke or inhale it through a vaporizer. In recent years, persons apart from Rastafarians have become open-minded to the concept of consuming products, “edibles”, made with cannabis. These edibles include cookies, salads, cakes, candies, breads, margarine and teas. These edibles have been found to have a longer lasting effect than smoking cannabis.

How much cannabis should be consumed to achieve the desired positive effects in persons with diabetes mellitus? How should the “edibles” be prepared? Should the leaves and/or buds be used? How much? Should it be consumed raw or cooked? As a tea or drink? Sweetened or unsweetened? Dried or green leaves? In baked goods, with or without sugar and fat?

As the medical community awaits legalization of cannabis for medicinal purposes along with recommendations on the safe amounts of ganja leaves, seeds and buds to use in preparing edibles to achieve desired effects in persons with diabetic neuropathy, let us as Registered Dietitians/Nutritionists open our minds to the future of cannabinoid use in the nutritional management of diabetes neuropathy.

# Debridement and Autologous Lipotransfer for Chronic Ulceration of the Diabetic Foot and Lower Limb Improves Wound Healing

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**Background:** The application of autologous lipotransfer (fat grafting, lipofilling) in reconstructive surgery is steadily becoming more popular as evidence of the regenerative and reparative effects of fat becomes better known. The authors investigated the use of autologous lipotransfer for treatment of chronic diabetic and other foot and lower limb ulcers.

**Methods:** Twenty-six patients with non-healing wounds were treated with surgical debridement and autologous lipotransfer (using the debridement and autologous lipotransfer method). The mean age of the wounds before inter-

vention was 16.7 months. Wound size after debridement averaged  $5.1 \pm 2.6 \text{ cm}^2$ . On average,  $7.1 \pm 3.3 \text{ cc}$  of lipoaspirate was transferred into the wound area.

**Results:** Twenty-two of 25 wounds (88 per cent) healed completely within a mean of  $68.0 \pm 33.0$  days. A reduction of wound size by 50 per cent was achieved after an average of four weeks. In one patient with an ulcer within particularly scarred tissues on the lower limb, a repeated session of lipotransfer led to complete wound healing after another four weeks.

**Conclusion:** The authors describe a simple and useful technique to improve wound healing in diabetic feet and chronic lower limb ulcers with a background of peripheral vascular disease, where other interventional options to achieve wound healing have failed.

*\*Presented by Jan Hochtritt. Previously published in Plast Reconstr Surg 2015; 136: 1357–66.*