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Original Research

## Does Type 2 Diabetes Mellitus Affect the Healing of Bell's Palsy in Adults?

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### Key Messages

- There are several opinions that type 2 diabetes mellitus has a bad influence on the prognosis of Bell's palsy. The present study investigated effect of type 2 diabetes mellitus on Bell's palsy healing process.
- Type 2 diabetes had no effect on Bell's palsy prognosis.

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### ABSTRACT

**Objectives:** Bell's palsy (BP) is defined as an acute facial weakness of unknown cause. Many factors affecting the healing of BP have been identified; 1 factor commonly considered relevant is the presence of type 2 diabetes mellitus. Our aim was to investigate the effects of diabetes on the healing of BP.

**Methods:** Sixty patients with BP were followed up for 1 to 3 years and were divided into 2 groups, those with and those without type 2 diabetes. All were prescribed prednisone (initially 1 mg/kg per day, with a tapered dose reduction) and acyclovir (200 mg orally every 4 h, 5 times daily, for 5 days). Their recovery times were compared.

**Results:** The healing times of the patients with and without diabetes did not differ.

**Conclusions:** Diabetes does not affect the severity, recovery rate from or healing of BP.

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### R É S U M É

**Objectifs :** La paralysie de Bell (PB) se caractérise par une faiblesse faciale soudaine dont la cause est inconnue. Parmi les nombreux facteurs qui nuisent à la guérison de la PB, le facteur généralement jugé pertinent est la présence du diabète sucré de type 2. Notre objectif était d'examiner les répercussions du diabète sur la guérison de la PB.

**Méthodes :** Nous avons suivi 60 patients atteints de PB durant 1 à 3 ans et les avons répartis en 2 groupes : les patients atteints du diabète de type 2 et les patients non atteints. Tous se sont fait prescrire de la prednisone (ordonnance initiale de 1 mg/kg par jour, suivie d'une réduction progressive de la dose) et de l'acyclovir (200 mg par voie orale toutes les 4 heures, 5 fois par jour, durant 5 jours). Nous avons comparé leur vitesse de guérison.

**Résultats :** La vitesse de guérison des patients diabétiques ou non diabétiques ne différait pas.

**Conclusions :** Le diabète n'a pas de répercussions sur la gravité, le taux de rétablissement ou la guérison de la PB.

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### Introduction

Bell's palsy (BP) (idiopathic unilateral facial paralysis) is the most common cause of acute nontraumatic peripheral facial palsy (1). The annual incidence of BP is 15 to 30 per 100,000 subjects, and equal numbers of males and females are affected (1,2).

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Approximately 70% of patients with BP recover completely without any treatment (3); with treatment, the rate rises to 90% (4). Many factors have been suggested as contributors to the healing process of BP. The most remarkable of these factors is diabetes. There is a common belief that diabetes affects the healing process of BP negatively. Although a relationship between diabetes and BP has been suggested, controlled studies are few in number. We explored whether diabetes affects the healing of BP.

## Methods

This was a retrospective case-control study approved by our ethics committee (#2015-107-04/11). The study was conducted in an otolaryngology clinic between October 2012 and October 2014. We enrolled 60 patients who complained of facial paralysis and were diagnosed with BP; they visited our clinic regularly during the first week after diagnosis. Each patient underwent a complete ear, nose and throat examination, a neurologic examination, routine blood testing (including blood sugar and glycated hemoglobin [A1C] levels), vital findings (including blood pressure), audiologic testing, serologic testing and magnetic resonance imaging with gadolinium enhancement. All patients were divided into 2 groups: those with type 2 diabetes and those without diabetes.

We enrolled 30 patients who were diagnosed as having type 2 diabetes according to American Diabetes Association Expert Committee criteria. Their serum A1C levels and diabetes-associated complications were recorded. The other 30 patients had no additional disease other than hypertension (HT).

Patients were routinely examined for facial-nerve motor functions: wrinkling the forehead, raising the eyebrows, closing the eyes, opening the mouth, difference in nasolabial folds, showing the teeth, baring the teeth and opening the mouth, pursing the lips, blowing out the cheeks. All patients were graded using the House-Brackmann system (Table 1) (5). The pretreatment degree of facial paralysis, according to the House-Brackmann system, are shown in Table 2. After treatment, those of House-Brackmann grade I were regarded as having recovered satisfactorily; House-Brackmann grades II through VI reflected unsatisfactory recovery. Patients with diabetes were hospitalized and monitored for vital parameters and blood sugar levels. At the beginning of treatment, patients with diabetes

**Table 1**  
House-Brackmann grading system

Grade	Description	Characteristic
I	Normal	Normal symmetrical function
II	Mild dysfunction	Slight weakness noticeable only on close inspection Complete eye closure with minimal effort Slight asymmetry of smile with maximal effort Synkinesis barely noticeable, contracture or spasm absent
III	Moderate dysfunction	Obvious weakness, but not disfiguring May not be able to lift eyebrow Complete eye closure and strong but asymmetrical mouth movement Obvious, but not disfiguring synkinesis, mass movement or spasm
IV	Moderately severe dysfunction	Obvious disfiguring weakness Inability to lift brow Incomplete eye closure and asymmetry of mouth with maximal effort
V	Severe dysfunction	Severe synkinesis, mass movement, spasm Motion barely perceptible Incomplete eye closure, slight movement corner mouth
VI	Total paralysis	Synkinesis, contracture and spasm usually absent No movement

**Table 2**

Distribution of patients with and without diabetes according to degree of facial paralysis before treatment

	Grade V	Grade IV	Grade III	Grade II	Total
Diabetes, n	6	4	11	9	30
	20%	13.3%	36.6%	30%	50%
No diabetes, n	9	3	10	8	30
	30%	10%	33.3%	26.6%	50%
Total	15	7	21	17	60
	25%	11.6%	35%	28.3%	100%

who were taking oral antidiabetic drugs were switched to insulin. A dose adjustment was made for patients using insulin. Then patients were placed on steroid therapy (initially, 1 mg/kg/day, reduced by half every day) and acyclovir (200 mg orally every 4 h, 5 times a day, for 5 days). Patients without diabetes were given the same treatment and were also monitored for blood pressure. The groups were compared in terms of recovery time and the severity of facial paralysis.

The effect of A1C serum levels on the severity of BP, the recovery rates and the durations of BP in patients with diabetes were explored. The recovery times of patients with and without complications of diabetes were compared.

## Statistical analyses

Statistical analyses were performed with the aid of SPSS v. 19.0 software (SPSS, Chicago, Illinois, United States). Data distributions were examined using the Shapiro-Wilk test. Continuous variables are expressed as means  $\pm$  standard deviations and categorical variables as frequencies with percentages. Continuous variables were compared using the independent samples t test or the Mann-Whitney U test. Categorical variables were compared using the chi-squared test. A p value  $<0.05$  was considered to reflect statistical significance.

## Results

The patients with diabetes were between 47 and 76 years of age (mean, 62.8 $\pm$ 8.79 years). The patients without diabetes were 25 to 70 years of age (mean, 47.5 $\pm$ 13.11 years); the mean age differed significantly in the 2 groups ( $p<0.001$ ). The group with diabetes contained 12 (40%) women and 18 (60%) men; the group without diabetes included 16 (53.3%) men and 14 (46.6%) women. The recovery times did not differ in the 2 groups ( $p=0.438$ ). We found no relationship between age and recovery time ( $p=0.876$ ). The 2 groups did not differ significantly in terms of the extent of facial paralysis ( $p=0.611$ ).

The 2 groups were compared in terms of recovery rates. No significant between-group differences were evident ( $p=0.947$ ). The average recovery time was 98.27 $\pm$ 213.76 days in the group with diabetes and 95.13 $\pm$ 137.51 days in the group without diabetes. The median recovery time was 30 days in both groups ( $p>0.05$ ).

All patients were evaluated in terms of concomitant HT. In the group with diabetes, 14 patients (46.6%) had HT, as did 6 (20%) in the group without diabetes. The proportions did not differ between the groups ( $p=0.055$ ).

The A1C levels of patients with diabetes were measured to assess the efficacy of long-term glucose control. The healing times were not significantly influenced by these levels ( $p=0.666$ ).

The complications in patients with diabetes are shown in Table 3; 10 patients had 1 complication, and 6 patients had more than 1. We asked whether these complications affected the healing times. Neuropathy did not affect the healing times ( $p=0.666$ ); neither did

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