Zuma Modified Maneuver as a Treatment to Geotropic Lateral Semicircular Canal Benign Paroxysmal Positional Vertigo

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Abstract

Introduction Benign Paroxysmal Positional Vertigo (BPPV) is the most common vestibular disorder, resulting from detached otoliths that migrate to one of the semicircular canals – canalolithiasis – or one of the cupulas – cupulolithiasis. The present study is related to lateral canal BPPVs, which may be either geotropic or apogeotropic. The geotropic variant of lateral semicircular canal benign paroxysmal positional vertigo (LC-BPPV) is attributed to free floating particles in the posterior arm of the lateral semicircular canal.

Objectives To verify the possibility of employing the Zuma repositioning maneuver, with a brief modification, as an alternative treatment for geotropic LC-BPPV.

Methods Seven patients with geotropic LC-BPPV were enrolled and treated with the Zuma modified maneuver. Patients were reevaluated 1 hour after a single maneuver, to confirm the resolution of vertigo and positional nystagmus.

Results All seven patients achieved immediate resolution of vertigo and positional nystagmus as measured 1 hour after the application of the maneuver.

Conclusion The Zuma modified maneuver was effective for geotropic LC-BPPV after a single application. The use of the Zuma maneuver for both apogeotropic and geotropic LC-BPPV may simplify the treatment of these patients.

Keywords ► geotropic lateral canal benign paroxysmal positional vertigo ► vertigo ► repositioning maneuver

Introduction

Benign paroxysmal positional vertigo (BPPV) is the most common vestibular disorder, resulting from detached otoliths that migrate to one of the semicircular canals – canalolithiasis – or one of the cupulas – cupulolithiasis. The posterior semicircular canals are the most commonly affected by these disorders, but lateral canals are also frequent sites; anterior semicircular canal BPPV (LC-BPPV) is less frequent. The present study is related to LC-BPPVs (LC-BPPV), which may be either geotropic or apogeotropic. The Zuma maneuver was initially designed to treat apogeotropic LC-BPPV.

The geotropic variant of LC-BPPV is attributed to free floating particles in the posterior arm of the lateral semicircular canal. It

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is characterized by horizontal nystagmus beating to the side of
the head turn in the supine roll test. On the other hand, the
apogeotropic variant of LC-BPPV is attributed to free floating
particles in the anterior arm of the lateral semicircular canal,
particles attached to the cupula facing the canal or particles
attached to the cupula facing the utricule. It is characterized by
horizontal nystagmus beating to the opposite side of the head
turn in the supine roll test.1–3

Different types of reposition maneuvers have been pro-
posed for the management of geotropic and apogeotropic LC-
BPPV: Gufoni maneuver, Zuma maneuver, Forced Prolonged
Position (Vannucchi Technique) and Barbecue Rotation
(Lempert maneuver, Vannucchi-Asprella maneuver).4–9

For practical reasons, since there are several types of
reposition maneuvers described for LC-BPPV, it was felt
that the Zuma maneuver, with a brief modification (Zuma
modified maneuver) could be an alternative treatment for
geotropic LC-BPPV.

Methods

The Zuma modified maneuver proposed to geotropic LC-
BPPV was based on the 3D biomechanical model designed by
Rajguru et al.10,11 as the original maneuver. The present
study was approved by the Ethics Committee (protocol
number CAEE 06137012.3.2002.5349).

A retrospective study was conducted on seven consecu-
tive patients who were diagnosed with geotropic LC-BPPV, all
without a history of trauma or concomitant neurotological
disease. – Table 1 gives information on the patients, as well as
the affected sides.

Benign paroxysmal positional vertigo was diagnosed when
characteristic horizontal nystagmus was demonstrated in the
supine head roll test or in the McClure–Pagnini test and the
Seated Supine Positioning Test (SSPT)12,13 using a Video
Frenzel goggle (Interacoustics, Middelfart, Denmark). The
McClure-Pagnini test was performed by turning the head ~
90° to each side in the supine position. Since it is performed on
the yaw plane, it should be more correct to call it the head yaw
test (HYT) while supine.14,15 In the SSPT, the patient is briskly
brought from the seated position to the supine position.12,13

All of the patients were treated with the Zuma modified
maneuver. The modification from the original maneuver is a
head turning 45° to the unaffected side, in the sitting position
(step I). Then, the patient is asked to lie down on the affected
side (step II). Next, the patient moves into dorsal decubitus and
the head is turned 45° toward the unaffected side (step III).
After that, the head is turned 90° toward the unaffected side
(step IV). Finally, the patient’s head is tilted slightly forward,
followed by a slow return to the sitting position (step V).
( Fig. 1). There is no age limit for the use of this maneuver.

After the performance of the modified Zuma maneuver,
its immediate therapeutic efficacy was determined by the
same neurotologist. Patients were reevaluated 1 hour after a
single maneuver, to confirm the resolution of vertigo and
positional nystagmus.

Results

All seven patients achieved immediate resolution of vertigo
and positional nystagmus as measured 1 hour after the
application of the maneuver.

Discussion

We suggest that the Zuma maneuver with a brief modifica-
tion (Zuma modified maneuver) could be an alternative
treatment for the geotropic variant of LC-BPPV.

There are several types of maneuvers described to treat
LC-BPPV, and some of them have to be performed toward the
unaffected side of the patient (i.e., Guffoni maneuver)4 and
others toward the affected side (i.e., Zuma maneuver).5 A
single maneuver with a brief modification, for both geotropic
and apogeotropic LC-BPPV, could simplify the treatment of
these cases, following the concept that the repositioning of
the otoliths should be performed from the affected side
toward the healthy side.

The modification from the original maneuver consists in a
45° head turning to the unaffected in the sitting position
(step I). Hence, when the patient is laid down toward the
affected side (step II), the lateral canal is placed in a vertical
plane and the otoliths start moving away from the ampulla
into the posterior arm. In the step IV, when the head is turned
90° toward the unaffected side, the posterior arm of the canal
is placed in the vertical plane, making the otoliths move away
from the ampulla, through the posterior arm of the canal, in
the direction of the utricule. The head tilting that is also
performed in the original maneuver prevents the particles
from moving back to the canal.

As the particles are free floating on the canal, there is no
need of the brisk acceleration that is used to detach the
otoliths from the cupula in cases of cupulolithiasis. There is
also no need to wait for 3 minutes in each position, like in the
original maneuver, for the same reason.

Conclusion

Despite the small sample of patients, the Zuma modified
maneuver was effective for geotropic LC-BPPV after a single
application. Further studies, however, are needed to evaluate
the efficacy of this maneuver. The use of the Zuma maneuver
for both apogeotropic and geotropic LC-BPPV may simplify
the treatment of these patients.

Table 1 Age, Gender and Affected Side of the Patients

| Patient | Age in Years | Gender | Affected side |
|---------|--------------|--------|---------------|
| 1       | 48           | female | left          |
| 2       | 59           | female | left          |
| 3       | 68           | male   | left          |
| 4       | 52           | female | left          |
| 5       | 67           | female | right         |
| 6       | 58           | female | left          |
| 7       | 63           | male   | right         |

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Fig. 1 The modification from the original maneuver is a head turning 45° to the unaffected side in the sitting position (step I). Then the patient is asked to lie down on the affected side (step II). Next, the patient moves into dorsal decubitus and the head is turned 45° toward the unaffected side (step III). After that, the head is turned 90° toward the unaffected side (step IV). Finally, the patient’s head is tilted slightly forward, followed by a slow return to the sitting position (step V). Data modified from Zuma e Maia 2016.5

Note
Approved by the Ethical Committee of the Universidade Luterana Brasileira (ULBRA RS, in the Portuguese acronym), Canoas, Brazil – CAEE 06137012.3.2002.5349.

Contributions
All authors contributed equally.

Conflict of interests
The authors have no conflict of interests to declare.

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