In each bone the round window niche (NW) showed a unique shape. In other words, there were no two similar niches in all dissected 35 specimens. In the other hand, in all specimens the niche, namely was formed by the bony structure and its mucosal covering. These structures and their relations to each other differed in a manner gave each bone its unique shaped round window niche.

At first, we observed the exact location of the niche in relation to the promontory (PROM) and the structures in front of or behind the niche. We divided the round window promontory into 29 bones (Fig. 1 and 2) and on the inferior surface in 6 bones (Fig. 5, 6, and 7). The niche was facing the sinus tympani (STY) when it was located in front of the promontory posterior surface (Fig. 5, but when sinus tympani was well pronounced and the niche was located on the posterior bony plate (Fig. 2). In the 29 specimens, where the niche was located on the posterior surface of the promontory, it was in 3 bones the round window niche was obliterated by mucosa (unusual secondary membranous) and surprisingly by the subiculum (SUB) (Fig. 6). In the other 6 bones, with the niche facing the sinus tympani, the niche was higher than the hypotympanum and was almost closed behind the promontory surface (Fig. 5, 6, and 7). The round window niche was higher than the hypotympanum was about (3 mm). The round window niche was almost closed by the promontory surface (Fig. 5). The niche, which is the upper process of the concamerata area (C), is in contact with the floor of the sinus tympani (STY) and the promontory superior surface (P). The position of the niche on the promontory anterior surface (Fig. 1) was only superiorly in one bone (Fig. 4). The position of the niche on the promontory middle surface (Fig. 1) was placed on the promontory middle surface (Fig. 2, 3). The niche in one bone was closed by the hypotympanum. The niche was facing the sinus tympani (Fig. 1, 3, 4). The niche was situated on the posterior surface of the promontory were its location was on the posterior surface of the promontory (Fig. 1, 2). The round window niche is a complex structure with a variable size and shape it is closed by mucosa in almost all specimens (Fig. 5). The round window niche was forming a bony plate. The round window niche was formed by the bony structure and its mucosal covering. The round window niche was a variable structure in the fundus area. It was absent or rudimentary in 8 bones and hypotympanic fossa (HYP) in 7 bones (Fig. 4, 5). The round window niche was variable in shape and size in all dissected 35 specimens. In the other hand, in all specimens the niche, namely was formed by the bony structure and its mucosal covering. These structures and their relations to each other differed in a manner gave each bone its unique shaped round window niche.

This study was undertaken to review the anatomical details and variations of the round window niche. In addition, to the level that made it unpractical to classify the niche into different anatomical categories according to these variations, but this classification was so complicated that it should not be approached blindly during different otologic procedures. Otoendoscopes can provide a significant help in guiding different approaches to the round window.

The niche had a well defined cavity of variable size and shape in all specimens (Fig. 1). This cavity was formed by the niche tegmen (T) laterally, and the fundus (F) medially anteriorly and inferiorly (Fig. 1). It contains in its upper and inferior part (cranio-posterior) and (posterior) the round window niche (Fig. 1). The shape and size of the cavity was related to the shape and size of the round window niche (Fig. 1). The shape of the round window niche was higher than the hypotympanum in 4 bones. The floor of the concamerata area was higher than the posterior bony plate (Fig. 3, 4). The floor of the concamerata was higher than the posterior bony plate (Fig. 3, 4). The niche was an extension to the floor of the sinus tympani (Fig. 1, 2). The niche was facing the sinus tympani (Fig. 5, 6). The niche was on the posterior surface of the promontory (P) in 3 bones (unusual secondary membranous). In the other hand, the round window niche is a complex structure with a variable size and shape it is closed by mucosa in almost all specimens (Fig. 5). The round window niche was forming a bony plate. The round window niche was formed by the bony structure and its mucosal covering. The round window niche was a variable structure in the fundus area. It was absent or rudimentary in 8 bones and hypotympanic fossa (HYP) in 7 bones (Fig. 4, 5). The round window niche was variable in shape and size in all dissected 35 specimens. In the other hand, in all specimens the niche, namely was formed by the bony structure and its mucosal covering. These structures and their relations to each other differed in a manner gave each bone its unique shaped round window niche. Thirty-four fresh frozen temporal bones were dissected, and the anatomical details were studied utilizing an operating microscope and enodscope with 5x, 10x, and 20x magnification. In each bone, we observed first the position of the round window niche and then we studied the mucosal folds and through posterior tympanotomy. Then after this the operating microscope was used. The photos were processed and from them the round window niche was classified into different anatomical categories according to these variations, but this classification was so complicated that it should not be approached blindly during different otologic procedures. Otoendoscopes can provide a significant help in guiding different approaches to the round window. Because of this, it should not be approached blindly during different otologic procedures. Otoendoscopes can provide a significant help in guiding different approaches to the round window niche. Because of this, it should not be approached blindly during different otologic procedures. Otoendoscopes can provide a significant help in guiding different approaches to the round window.

Problem Addressed:
Round window is the main target in many modern otologic procedures. Unfortunatelly, it is approached either blindly or indirectly in most of these procedures. Others necessitate a complex technique in order to approach the window directly. Many failures have been shown to be due to difficulties in the approach and anatomical variations. This study was undertaken to review the endoscopic techniques to approach the round window.

Methods and Measures:
Thirty-four fresh frozen temporal bones were dissected. Anatomical details and different approaches (mainly the transcranial transtympanic and the posterior tympanotomy approaches) were studied utilizing an operating microscope and otoendoscopes with 0°, 30° and 70° angles and 2.7 and 3.0 mm diameters.

Results:
Marked anatomical variations in the surgical pathways to the round window were observed. Mucosal folds variation was the main observation with complete isolation of the window in 3 bones (8%). Bone overhangs, unusual secondary tympanic membrane, and variations in size, shape, and window directions were also detected.

Conclusions:
The approach to the round window is influenced by the development and arrangement of the middle ear contents especially mucosal tracks and folds. It is especially clear in cases with no or limited middle ear pathology. The incorporation of otoendoscopes during the middle ear procedures help to ensure safe and complete exposure of the window regardless of these anatomical variations.

Clinical Significance of Study:
To address the minimally invasive approaches to the round window.

Round window niche area has a very high incidence of anatomical variations and the approach to it is influenced by the development and arrangement of the middle ear contents especially mucosal tracks and folds. This is especially clear in cases with no or limited middle ear pathology. The incorporation of otoendoscopes during the middle ear procedures helps to ensure safe and complete exposure of the window regardless of these anatomical variations.

INTRODUCTION

The round window niche might be the main target in many modern otologic procedures. These include posterior superior pars incus surgery in the context of chronic otitis media with retraction pockets, facial nerve tumor, temporal bone fractures, extension of the middle ear surgery, and enucleation of the drum. The round window niche is by far the most confined and the most restricted area of the tympanic cavity. It is composed of the round window membrana (RWM) and the round window niche (NW). The round window window niche is not the result of a single bone but of a combination of bones that form the promontory. The round window niche is composed of the superior angular bone, the anterior angular bone, the posterior angular bone, and the tegmen. The round window niche is bounded superiorly by the tegmen of the niche that is formed of a bone column. The round window niche is bounded anteriorly by the anterior angular bone, posteriorly by the posterior angular bone, and inferiorly by the subiculum (SUB) (Fig. 6). In the other 6 bones, either the niche facing the sinus tympani was higher than the hypotympanum was almost closed by the hypotympanum (Fig. 3, 4). The floor of the concamerata was higher than the posterior bony plate (Fig. 3, 4). The niche was an extension to the floor of the sinus tympani (Fig. 1, 2). The niche was facing the sinus tympani (Fig. 5, 6). The niche was on the posterior surface of the promontory (P) in 3 bones (unusual secondary membranous). In the other hand, the round window niche is a complex structure with a variable size and shape it is closed by mucosa in almost all specimens (Fig. 5). The round window niche was forming a bony plate. The round window niche was formed by the bony structure and its mucosal covering. The round window niche was a variable structure in the fundus area. It was absent or rudimentary in 8 bones and hypotympanic fossa (HYP) in 7 bones (Fig. 4, 5). The round window niche was variable in shape and size in all dissected 35 specimens. In the other hand, in all specimens the niche, namely was formed by the bony structure and its mucosal covering. These structures and their relations to each other differed in a manner gave each bone its unique shaped round window niche. Thirty-four fresh frozen temporal bones were dissected, and the anatomical details were studied utilizing an operating microscope and enodscope with 5x, 10x and 20x magnification. In each bone, we observed first the position of the round window niche and then we studied the mucosal folds and through posterior tympanotomy. Then after this the operating microscope was used. The photos were processed and from them the round window niche was classified into different anatomical categories according to these variations, but this classification was so complicated that it should not be approached blindly during different otologic procedures. Otoendoscopes can provide a significant help in guiding different approaches to the round window. Because of this, it should not be approached blindly during different otologic procedures. Otoendoscopes can provide a significant help in guiding different approaches to the round window. Because of this, it should not be approached blindly during different otologic procedures. Otoendoscopes can provide a significant help in guiding different approaches to the round window.

This study was undertaken to review the anatomical details and variations of the round window niche. In addition, it aimed at providing a simplified but accurate description of its gross morphology. Also, to review the role of roundwindow to facilitate and ensure safe and controlled approaches to the round window.

In each bone its unique shaped round window niche. In other words, there were no two similar niches in all dissected 35 specimens. In the other hand, in all specimens the niche, namely was formed by the bony structure and its mucosal covering. These structures and their relations to each other differed in a manner gave each bone its unique shaped round window niche.