

***Ranathunga R.M.S.T., Nuwara Hewage W.N.P.***

**ANATOMICAL VARIATIONS OF THE MAJOR AND MINOR DUODENAL PAPILLA  
AND FUSION PATTERNS OF THE PANCREATIC AND COMMON BILE DUCTS**

***Tutor: PhD, associate professor Trushel N.A.***

*Department of Normal Anatomy  
Belarusian State Medical University, Minsk*

The major duodenal papilla functions as the primary ductal structure by which bile together with pancreatic fluids enter the duodenal lumen thus holding important medical implications for its structural patterns. The research analysis derived from ten scientific articles and five duodenal specimens showed that sixty percent (3/5) had a single papillary orifice (major duodenal papilla) but forty percent (2/5) displayed major and minor duodenal papillae. Measures in Sulochana et al. (2013) showed the major papilla obtained an average diameter of 7.6 mm (span 3-17 mm) and the minor papilla measured at 4 mm width (range 2-12 mm).

Four main variations were observed in the pancreaticobiliary duct system. The most prevalent and least dangerous anatomical pattern known as type 1 presented fusion of pancreatic ducts with common bile ducts before entering the ampulla and was found in more than 70% of patients. The type 2 ductal configurations had split openings for the ducts which posed a higher chance of developing choledocholithiasis because bile drainage became hindered. The failed embryonic dorsal and ventral pancreatic duct fusion resulted in pancreas divisum (Type 3) anatomy which affects 10% of embryonic development and contributes to 18% of clinical patients and leads to a 31% increase in recurrent pancreatitis. Type 4 ductal malformations presented an abnormally extended common channel that exceeded duodenal wall bounds while carrying associations with biliary malignancies and choledochal cysts.

Different pancreas anatomies deliver crucial challenges to medical professionals when performing endoscopic retrograde cholangiopancreatography (ERCP) procedures because of possible cannulation obstacles. Some structural arrangements of pancreatic ducts make patients more vulnerable to developing pancreatitis through the process of reflux or drainage blockage. The new diagnostic methods combining advanced imaging technologies with artificial intelligence-based features enable precise evaluation of such pancreatic duct variations. Genetic studies have recognized several essential markers consisting of CFTR, SPINK1 and developmental HNF1 $\beta$  and SOX9 genes that produce ductal abnormalities.

The review establishes important population differences because pancreas divisum manifests more commonly in Western groups (7-10%) than it does in Asians (3-5%). Preoperative anatomical evaluation remains essential for medical practitioners to identify procedural risks correctly and create appropriate interventions. Citations show a full understanding of personal anatomical arrangements by demonstrating how minor papilla sphincterotomy functions specifically for pancreas divisum patients. Future investigations into new imaging methods and genetic studies will boost knowledge about and medical approaches to significant anatomical variations that affect patient care.