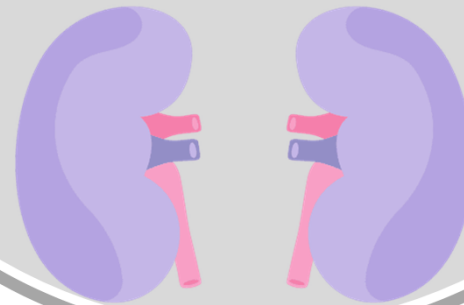




**Oral health in
patients with chronic
renal failure**



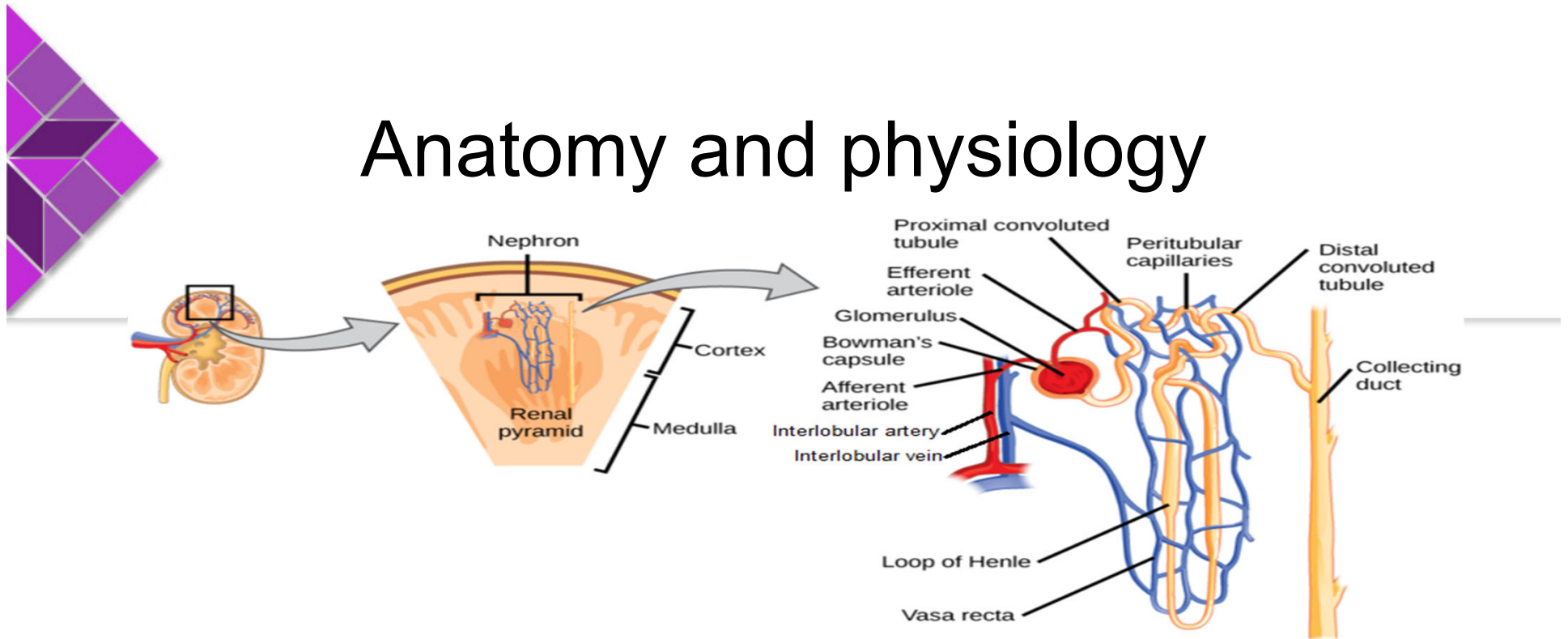
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INTRODUCTION

- “ Patients with renal diseases belong to the group of patients who should be given special attention due to the condition in which the patients are.
- “ The main goal of medical treatment is to conservatively slow down the progression of the disease and enable a quality life for the patient, and the goal of dental treatment is to repair the oral cavity and teeth at the highest possible level and eliminate possible sources of infection.
- “ The dentist must consider the patient's health status and whether the patient is on a conservative diet and medication program or undergoing hemodialysis therapy.

Anatomy and physiology

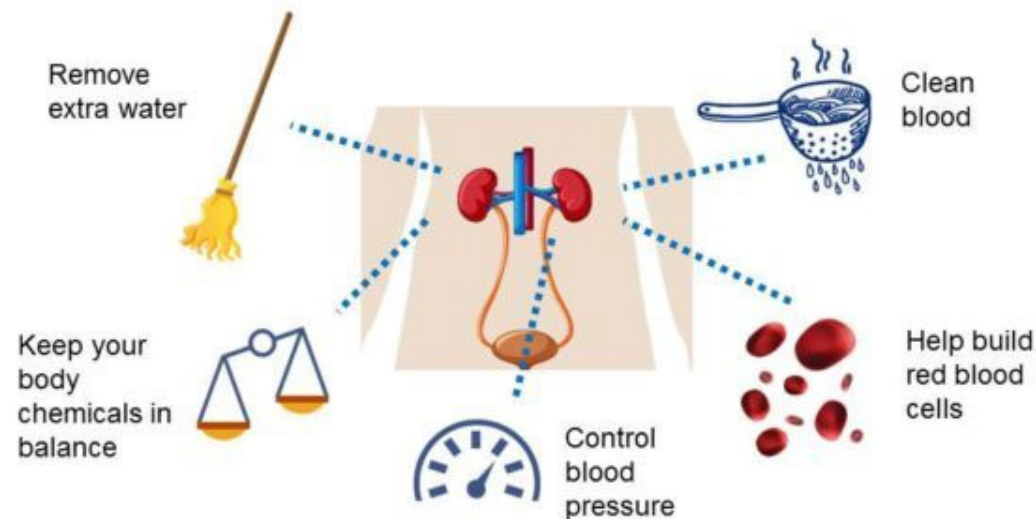


Kidneys are paired organs, located in the posterior abdominal cavity, retroperitoneally. The right one is placed lower, due to the suppression from the liver. The concave part of the kidney is called the hilus and consists of the renal pelvis in which the urine collects. A longitudinal section of the kidney along the convexity shows the renal cortex, which is covered by a fibrous capsule. Beneath the cortex is the renal medulla. The basic structural and functional unit of the kidney is the nephron. Each kidney has over one million nephrons. They are composed of glomeruli, tubules and collecting ducts.



As aforementioned, the kidney contains numerous functional units called nephrons that produce urine through consecutive processes: 1) glomerular filtration; 2) tubular reabsorption and 3) tubular secretion. The transport system in the renal tubules has a limit in terms of substances which he can transport in one time. The transport system involves almost all natural organic and some inorganic substances. These substances are usually glucose, amino acids, small peptides and proteins, ketone bodies, calcium, phosphate. Exception regarding natural organics substances is urea

What do the Kidneys do?



Clinical aspects

•NEPHROTIC SYNDROME

Syndrome of proteinuria, hypoproteinemia and edema. It is manifested by: pale, soft testy swellings, localized periorcular, palpebral, lower legs, ascites, up to anasarca and effusions of serous membranes. Mechanism of swelling: reduction of colloid-osmotic pressure.

•NEPHRITIC SYNDROME


Criteria: hematuria, proteinuria, oliguria, hypertension. Causes: glomerulonephritis after streptococcal infection, acute exacerbation of chronic glomerular disease (glomerulopathies)

•ACUTE RENAL FAILURE

Acute renal failure (ARF) is a syndrome with a different etiology that is characterized by a sudden drastic reduction of renal hemoperfusion and GFR below 5ml/min. Symptoms: edema, hypertension, hyperglycemia, acidosis oligo or anuria.

•CHRONIC RENAL INSUFFICIENCY

It represents progressive and irreversible damage to kidney function during various diseases. Today, diabetes and hypertension are leading causes of CRI, both of the kidneys or the urinary system. Symptoms: edematous syndrome, anemia, oliguria or anuria, hypertension, hyperkalemia, metabolic acidosis, anemia.



Symptoms and clinical signs of kidney disease

Oral	Rtg	symptoms
<ul style="list-style-type: none"> • Uremic stomatitis • Xerostomia • Candidiasis • Oral lesions • Petechiae and ecchymoses • Gingival bleeding • Changes in periodontal tissues • Altered taste • Teeth wear lost • Sensitivity of the oral mucosa • Changes in hard dental tissues 	<ul style="list-style-type: none"> • Demineralization of bone • Loss of bone trabeculae • "milk glass" phenomenon • Loss of lamina dura • Giant cell (tumor-like) lesions 	<ul style="list-style-type: none"> • Disturbance in urination • Disturbance in the composition of urine (hematuria, proteinuria) • Volume disturbance (oliguria, polyuria, anuria) • Edema • Pain • Skin changes



Influence of end-stage renal insufficiency on oral health



- About 90% of patients with kidney failure show oral signs and symptoms, some of them are caused by the disease, while others may be caused by the treatment. Decreased kidney function results in an increase in levels of urea in the blood, and thus an increased level of urea in the saliva, where it is the same converts to ammonia. For this reason, uremic individuals have a characteristic halitosis (uremic fetor), which also occurs in about a third of patients on hemodialysis. This halitosis is manifested as perception of an unpleasant, metallic taste in the mouth.
- Apart from urea, there can be other changes in the composition of saliva such as an increase in the concentration of phosphates and proteins and changes in the pH of saliva.



Influence of end-stage renal insufficiency on oral health



- Also, these patients can also have sensory disturbances, such as changes in taste perception, especially for sweet and sour.. These phenomena are due to high levels of urea, the presence of dimethyl- and trimethyl-amines or low levels of zinc (due to malabsorption resulting from gastrointestinal disorders. There may also be burning sensation on the lips and tongue, of neuropathic origin.
- Hyposalivation occurs as a result of reduced fluid intake or as a result of secondary effects of drugs (mainly antihypertensives), as a result of the atrophy of the parenchyma of the small salivary glands or due to mouth breathing.
- The present anemia that occurs as a consequence of reduced synthesis of erythropoietin, which can be clinically observed skin and the mucous membrane. Uremic stomatitis is clinically characterized by the presence of erythematous lesions that may be localized or generalized.



Influence of end-stage renal insufficiency on oral health

- Regarding the dental anomalies in these patients, the eruption delayed teeth in children. Another sign that is often found in children is the presence of hypoplasia of enamel, due to changes in the metabolism of calcium and phosphates. In adults reduction of the pulp chamber is often observed. In patients with kidney diseases, non-carious loss of dental tissues are mostly found.
- In patients with kidney diseases, there is a higher incidence of periodontal disease, bone loss, gingival recession and deep periodontal pockets. Osteodystrophy occurs in these patients. This is a late sign of renal failure disease and because of these changes occur in the metabolism of calcium and phosphorus, abnormal metabolism of vitamin D and the compensatory hyperactivity of parathyroid glands



To kidney transplant patients immunosuppressive therapy is prescribed and thus they become more susceptible to infections and development of malignant neoplasms.

- Bleeding tendency in these patients may be due to factors in depending on the disease, as well as changes in platelet aggregation or because of the renal anemia (which occurs secondary to deficient erythropoiesis) or in turn, as a result of dialysis, which leads to a decrease in the number of platelets due to mechanical damage or due to the use of heparin.
- The fungal infections, the lesions are mainly associated with *Candida albicans*.
- Herpes group of viruses, in particular cytomegalovirus (CMV) and herpes simplex virus (HSV), are often associated with immunosuppressive patients after organ transplantation.





End-stage patients

- The occurrence of gingival hyperplasia due to immunosuppressive therapy is the most studied oral manifestation. It is estimated that 30% of patients who are on cyclosporine therapy show clinically significant gingival enlargement. When patients are treated with a combination of cyclosporine and nifedipine the prevalence of gingival enlargement increases to 50%. This effect occurs within 3 months of treatment.
- The most important characteristics in these patients are the existence of a tendency to bleeding, hypertension, anemia, drug intolerance, increased susceptibility to infections and the presence of several manifestations related to the disease or the treatment of the disease. There is also an increased susceptibility to infection endocarditis and vascular infections caused by bacteria of oral origin in patients undergoing hemodialysis



Dental management

- In case of need dental treatment in patients on conservative renal treatment adequate communication with a nephrologist is recommended, in order for dentists to be aware of the stage of the disease and its treatment. Before any invasive dental procedure an examination should be done for the existence of any hematological problems. The possibility of any 12 secondary infection should also be carried. Recommendation for the use of drugs, those that are nephrotoxic must be avoided (tetracyclines, aminoglycosides), while some of them need to be adjusted the dose.
- In cases of peritoneal dialysis, a catheter is placed in the abdominal wall and inserted into the peritoneum through which access is gained to the body, in order to remove the nitrogen and other metabolic toxic products. This type of dialysis can be done at home, but it must be done every day. No special measures are required for these patient's dental treatment, in addition to the above mentioned.



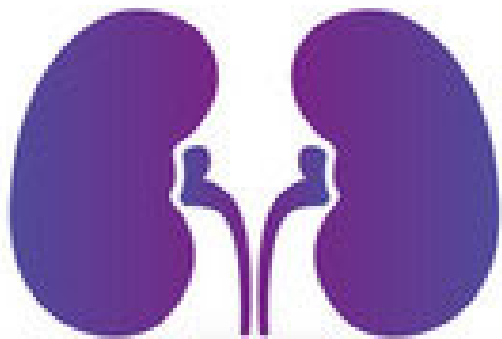
Dental management

- A patient with kidney disease during hemodialysis. In hemodialysis, the process filtering is done with a machine (dialyzer), outside the patient's body. This procedure is done three times a week. In order to remove the blood from the body and to doors, it is necessary to have vascular access. Permanent vascular access is obtained by surgically connecting an artery and a vein, with the help of a blood vessel (arteriovenous shunt) or through a synthetic bridge (arteriovenous graft). In the hemodialysis process, the patient's blood is anticoagulated with heparin. For this reason, when performing dental treatment there is a risk of bleeding and they must not be performed on the day of hemodialysis. If it is necessary to perform an emergency dental intervention, protamine sulfate is used (which is a heparin antagonist) to block the anticoagulant effect. In these patients there is also a risk of infection due to the vascular access and transmission of HBV, HCV and HIV.



Conclussion

- The knowledge of the basic anatomical characteristics and pathological changes of kidneys, as well as the signs and symptoms of their diseases allow them to avoid numerous complications in everyday practice that may occur during dental interventions in such patients.



*Thank
You!*