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內文：

- Objective：The objective of this review was to explore the interaction between chronic renal disease, renal replacement therapy and periodontal diseases based upon the results of studies published within the last decade
- **Introduction**：
  - The prevalence of chronic renal disease in industrialized countries is increasing and, when coupled with improved rates of survival for renal replacement therapies
  - Recent studies suggest that chronic adult periodontitis can contribute to overall systemic inflammatory burden and may therefore have consequences in the management of the end stage renal disease (ESRD) patient on hemodialysis (HD) maintenance therapy
- **Chronic renal disease, end-stage renal disease and renal replacement therapy**
  - Renal function is assessed, in part, by measurement of the glomerular filtration rate (GFR). GFR is estimated using serum creatinine concentration and several other patient variables by the following equation
    - ✧ GFR(ml min^{-1}/1:73 m^2) = 175 × $(Scr)^{-1.154}$ × (age in years)$^{-0.203}$ × (0.742 if female) × (1.210 if African_American)
  - Glomerular filtration rate in the normal adult varies between 100 and 120 ml min)1⁄1.73 m2 body surface area.
  - Early in chronic renal disease, several compensatory mechanisms and intervention strategies can maintain homeostasis including glomerular hyperfiltration and hypertrophy of the remaining glomeruli, alteration in the diet and the use of phosphorous binding compounds, administration of 1, 25 dihydroxy vitamin D3, recombinant erythropoietin and anti-hypertensive medications, and in the young,
  - However, once the GFR falls below the range of 10–20 ml min)1⁄ 1.73 m2 body surface area in progressive chronic renal disease and blood urea nitrogen levels rise to 100–150 mg dl)1 (normal values are between 10 and 20 mg dl)1), compensatory mechanisms fail and ESRD ensues
  - The most common causes for ESRD in the United States are diabetes mellitus, glomerulonephritis and chronic hypertension. The main cause of death in ESRD populations on renal replacement therapy is atherosclerotic complications including myocardial infarction
  - However, inflammation is also a major contributing factor as the best predictor of both cardiac and all-cause mortality in ESRD populations is C-reactive protein (CRP) a major acute phase protein and systemic marker of inflammation
  - HD is by far the more common form of dialysis in adult ESRD populations with a point prevalence rate of 1021.1 cases per million individuals reported

for 2003 in the United States

- Far greater renal function can be provided by renal transplantation, the preferred form of renal replacement therapy. Because of the near impossibility of achieving a perfect HLA complex match between a nonconsanguineous donor and recipient, continuous immune suppression after renal transplantation is required to prevent graft rejection.
- Graft survival rates of 83% for 1 year and 65% for 5 years have been reported for cadaver-donor kidney transplants and improved rates of survival of about 10–15% have been reported for live-donor kidney transplants
- The disadvantages of renal transplantation include susceptibility to opportunistic infection because of immune suppression, a tendency for decreased kidney function with increasing age of the transplanted kidney and hypertension

➢ **Eects of chronic renal disease on periodontal tissues**

- Chronic renal disease has well-documented effects on oral tissues including xerostomia, delayed tooth eruption, calcifications leading to obliteration of pulp chamber and canals, enamel hypoplasia, decreased caries rates and altered salivary pH levels
- Specific effects of chronic renal disease and renal replacement therapy on periodontal tissues include gingival hyperplasia in immune suppressed renal transplantation patients and increased levels of plaque, calculus and gingival inflammation and possible increased prevalence and severity of destructive periodontal diseases in ESRD patients on dialysis maintenance therapy.
- Gingival hyperplasia secondary to calcineurin inhibitors and calcium channel blockers is the most reported effect of chronic renal disease on periodontal tissues.
- In recent reports, the prevalence of cyclosporine-induced gingival hyperplasia for renal transplant patients varied from 22% to 58%
- Most studies report gingival hyperplasia to be associated with increased cyclosporine dosage, the presence of increased plaque and gingival inflammation and is more commonly seen in the young
- In the past 10 years, tacrolimus has been increasingly favored over cyclosporine as an immune suppressive drug, especially in younger renal transplant recipients. The incidence of gingival hyperplasia in renal transplant patients receiving tacrolimus is typically less than those reported for cyclosporine, generally between 0% and 15%
- However, for both cyclosporine and tacrolimus, the addition of a calcium channel blocker, especially nifedipine, can increase the incidence and severity of gingival hyperplasia
- Increased levels of plaque have been reported for HD populations from several countries. Associated with increased plaque in ESRD populations on HD maintenance therapy was increased calculus formation and attendant gingival inflammation
- Most prominently, ESRD patients on HD are in a state of chronic kidney failure resulting in the uremic syndrome, and uremia has been associated with immune dysfunction including defects in lymphocyte and monocyte function (Cohen et al, 1997). Therefore, if uremia is responsible for the increased gingival inflammation observed in this population
- Increased gingival inflammation and periodontitis has been reported

inassociation with increased dialysis vintage in several, but not all studies
- the presence of confounding diseases such as diabetes mellitus could contribute to the increased gingival inflammation reported for renal HD populations
- Alterations in calcium homeostasis leading to secondary hyperparathyroidism have been suggested as a possible cause of increased gingival inflammation and possible alveolar bone loss in renal HD populations.
- However, conflicting results on the status and severity of periodontitis have been reported for ESRD populations.

➢ **Potential effects of periodontitis on ESRD patients on hemodialysis maintenance therapy**
- When compared with the general population, ESRD patients on HD maintenance therapy suffer a greatly increased rate of mortality because of atherosclerotic complications, especially among the younger age groups.
- Mortality is highly associated with increased inflammatory burden in the ESRD population as CRP, an acute phase protein and systemic marker of inflammation, is a major risk predictor for both cardiac and all cause mortality in this population. CRP has also been defined as a major risk predictor for atherosclerotic complications in the general population and supplements traditional cardiac risk factors such as serum lipoprotein profiles in the prediction of cardiac events
- Moderate to severe periodontitis has been shown to increase serum inflammatory markers including CRP
- A study reported that initial or severe periodontitis was also associated with renal insufficiency, defined as a GFR of <60 ml min)1⁄1.73 m2, and with increased serum creatininelevels
- Most importantly, two intervention studies have reported that effective periodontal therapy can result in decreased levels of CRP in periodontitis patients. Two reports suggest periodontitis may contribute to systemic inflammatory burden in ESRD populations.
- A recent report of 253 ESRD patients on HD maintenance therapy from Taiwan clinically examined subjects for periodontal disease status and severity and reported CRP values to be correlated with periodontitis severity

➢ **Conclusions**
- Chronic renal disease can have significant effects on periodontal health including gingival hyperplasia in renal transplant patients receiving calcineurin inhibitors and calcium channel blockers. In addition, most epidemiologic studies have reported increased levels of plaque, calculus and gingival inflammation in ESRD populations. Whether an increased prevalence and severity of periodontitis exist in ESRD populations remains controversial. However, in view of the high rate of mortality from atherosclerotic complications, the strong association between increased inflammatory burden and atherosclerotic complications, and the possible contribution to systemic inflammation from periodontitis, the periodontal status of all chronic renal disease patients needs be carefully monitored

題號	題目
1	下列哪一種細胞出現在牙齦溝的比例最高 (A) 多核性白血球

	(B) T細胞 (C) 巨噬細胞 (D) B細胞
答案(A)	出處：Carranza's Clinical Periodontology
題號	**題目**
2	對於有糖尿病史的患者，下列哪一種藥物是禁忌
	(A) Glucocorticoids (B) Antihistamines (C) Barbiturates (D) Benzodiazepines
答案(A)	出處：Goodman and Gilman's the pharmacological basis of therapeutics