

A Clinical Guide to Proper Diagnosis and Treatment Planning of Patients with Gingival Health, Gingivitis, and Periodontitis

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Video #1: Med Hx and Radiographs

Short video review of the common medical/dental/social histories that you will see with your patients, and the connection to periodontal health. Needed radiographs are discussed, and in what situations they are most useful in.



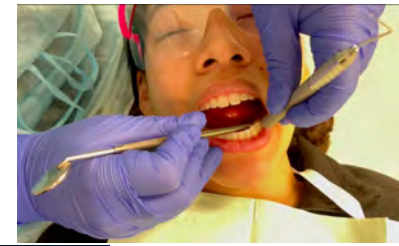
Video #2: Measurement of Periodontium

Thorough video review of how to correctly measure the periodontium, including: pocket probing, free gingival margin, clinical attachment, mobility. Common mistakes made by students in clinic are highlighted, and useful tips and tricks are discussed.



Video #3: Diagnosis and Treatment Planning

Video explaining how to diagnosis and treatment plan for your patients' periodontal health. Included is how to navigate the new "staging and grading" diagnosis system created by the AAP.



PIP Project - **A Clinical Guide to Proper Diagnosis and Treatment Planning of Patients with Gingival Health, Gingivitis, and Periodontitis**

Health History (Common findings affecting Periodontal health):

It is vital to take a complete and comprehensive health record of EVERY patient you see in the clinics. This is done in the Subjective portion of the exam, and is obtained through what the patient tells you and by their medical documents/history. You should obtain at the MINIMUM, with common findings that are “red flags” in regards to Periodontal health:

- 1. Medical history**
 - a. Uncontrolled diabetes
 - b. HIV+
 - c. Uncontrolled hypertension
 - d. Obese
 - e. Pregnant
 - f. Cancer
- 2. Dental history**
 - a. Patient has history of SRPs or “deep cleanings”
 - b. Patients gums bleed when brushing or flossing
 - c. Patient has lost teeth (not due to decay or trauma)
 - d. Patient has bad breath that won't go away
- 3. Social history**
 - a. Smoking
 - b. Excessive alcohol consumption
 - c. Drug abuse
 - d. Stress
- 4. Medications (Both past and present)⁴**
 - a. Phenytoin (Dilantin)
 - b. Cyclosporin
 - c. Ca channel blockers (Nifedipine, Amlodipine)
- 5. Allergies**
 - a. Nickel or other metal allergies

Taking a thorough history is important for all patients, but is extremely important in the periodontal patient. This is due to the recent findings of the correlation between Periodontitis and systemic disease, due to the chronic inflammation of Periodontitis.¹ Periodontitis has been found to have a link with various systemic diseases, but most notably with **diabetes**. Other links found are shown in the image below.



Having a complete picture of your patient's health history will allow you as a clinician to accurately diagnose and correctly treat a periodontal patient.

Radiographs (which ones to take/how often/how to evaluate in terms of Periodontal health):

All patients should have up to date radiographs on file. Preferably, the patient would have an FMX within 3-5 years (depending on insurance coverage). Using your clinical judgement, and the patient's caries risk, you may decide how often the patient should receive bitewings and select PAs (if necessary).

Bitewings are essential to assess the bone levels in both the Maxilla and Mandible. Using Bitewings, you will be able to better visualize signs of bone loss due to periodontal disease and possible furcation involvements. This is due to the horizontal angulation of the X-ray beams, resulting in less image distortion. Bitewings should be taken with the sensor vertical to better capture the level of the bone.

PAs are helpful in visualizing the entirety of the tooth, especially the apical third. These images capture the Crown:Root ratio of teeth, assisting in determining the prognosis of periodontally involved teeth. These radiographs are useful when diagnosing possible pathology occurring in

the oral cavity. These are also essential in cases where you are planning implant placement, to gain a deeper understanding of the patient's anatomy and edentulous site.

Panos can be taken in cases where patients have difficulty with intraoral radiographs. Panos may be used for big-picture use of the entire mouth, but should not be used as a baseline for periodontal patients. There is too much image distortion, especially in the anteriors, to accurately show bone levels. An FMX is generally indicated for periodontitis patients. In implant placement, it is a crucial tool to visualize adjacent anatomical structures and give an understanding of implant placement.

CBCT in periodontics is almost exclusively used in the cases of implant placement. Due to its higher radiation dose to the patient, it should only be used in cases that will benefit the patient. It should be used when there are possible bone defects, sinus involvements, and unusual anatomy that may present troubles during the surgical procedure. Its use in eriodontitis patients, however, is still being investigated.⁵

Measuring the Gingiva correctly (Step 2 ODTP... Probing, FGM, CAL, Mobility, Furcations, MGI). (Include instrument holding/motion, operator positioning) (Peri-Implant measurement):

Pocket Depths (PD): measurement from the base of the sulcus to the gingival margin

When measuring pocket depths, the clinician requires the use of a mouth mirror and a periodontal probe. In the dominant hand, the periodontal probe should be held using a modified pen grasp. When probing, avoid excessive apical pressure -- the goal is to have the periodontal probe slide into the sulcus until it experiences some resistance, which should indicate that the probe has reached the base of the pocket. The probe should be walked along the surface (imagine a karaoke bouncing ball) from one interproximal to the other.

There are three concepts that are very important to periodontal probing: adaptation, walking steps, and access.

- Adaptation: the working end of the periodontal probe should be parallel to the long axis of the tooth being probed. This will ensure that the probe accesses the periodontal sulcus in its entirety.
- There are six recorded periodontal measurements recorded per tooth (MB, B, DB, DL, L, ML). A common error while measuring is doing a slide across the tooth rather than a bobbing motion to evaluate the depth, which does not allow accurate access to each area of the sulcus.
- Access is very important and commonly missed at the interproximal areas -- clinicians tend to be too parallel or over-angled.

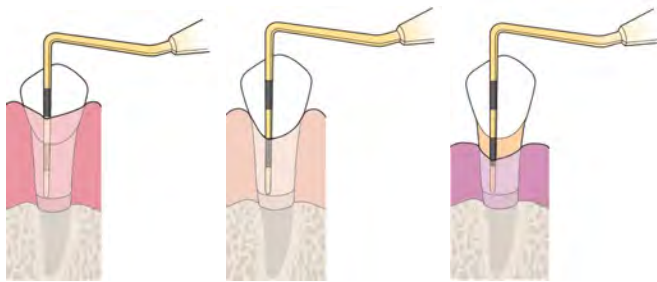
Tip: In healthy pockets, tissue will blanch once the probe has reached the base of the pocket. This is a good way to measure the proper force used for probing.

Probing seating: Seating positioning of operator, Axium order of probing

FGM: Free Gingival Margin is the measurement of the distance from the gingival margin to the CEJ

- FGM can be +, 0, or -
 - +: gingival overgrowth (gingival margin is coronal to the CEJ)
 - 0: gingival margin is at the same level of the CEJ
 - -: gingival recession (gingival margin is apical to the CEJ)

IMPORTANT NOTE: At Pacific, gingival recession is marked as **negative** number and free gingival levels located coronal to the CEJ are denoted as **positive** numbers because of how Axium calculates the CAL from these measurements. On the WREBS, these values are flipped to simplify the math for the clinician.



- Identify the location of the CEJ through visual or tactile means. If CEJ is not seen, you may use an explorer or periodontal probe and lightly move back and forth in the sulcus until you feel the slight “click” from the CEJ.
- FGM is sometimes **very hard** to assess clinically, and may be complicated by heavy subgingival calculus levels.
 - **Commonly measured incorrectly by students at Pacific**
- On posterior teeth, we can take advantage of the fact that the CEJ level is consistent all around the tooth
 - If you can find the facial CEJ or lingual CEJ (Close to gingival margin), then we can estimate the interdental GM even if we can’t feel it with our explorer!
- Do not measure FGM at the line angles, rather measure this interproximally. This is because we are measuring pocket depths interproximally where the pockets are usually slightly deeper, which would correlate to an inaccurate determination of attachment levels interproximally.
- For anterior teeth, you cannot use the same method as for posteriors. The CEJ level is **not** consistent around the entirety of the tooth.
 - If struggling to find the CEJ clinically, use radiographs to assess the bone level. There is a stronger correlation between bone levels and attachment levels in the anterior teeth.
 - If bone level is 1-2mm away from CEJ, then you can assume not much attachment loss

CAL

In order to calculate clinical attachment loss, the measurements from PD and FGM must be recorded first. Once recorded, the following equation may be used to determine CAL. AxiUM automatically calculates attachment loss based on the values inputted into the "Perio" chart.

- Clinical attachment loss = probing depth - free gingival margin (AxiUM)
- Clinical attachment loss = probing depth + free gingival margin (WREBS)
 - Easier math

Implants

- Avoid scratching the implant with a stainless steel probe
- Gentle probing (<0.25 N) is used to assess BOP
- Use a fixed reference point as a landmark to allow a baseline reference for FGM/CAL
- It may be assumed that after probing, the peri-implant attachment to the titanium may be re-established within 4-5 days

Mobility

We want to utilize the non-functional blunt ends of two instruments (for example, the ends of a mirror and periodontal probe) when checking the mobility of the tooth. One instrument end is placed on the lingual aspect of the tooth, while the second instrument is placed on the facial aspect. Next, use the first instrument to apply force against the lingual aspect of the tooth, then repeat the process with the second instrument onto the facial aspect of the tooth. The amount of movement measured in the facial-lingual direction and depressibility of the tooth in the socket are then used to classify the mobility of a tooth.

Mobility is categorized into three classes based on the amount of movement that occurs: grade I, II, and III.

- Grade I: up to 1mm of movement in F-L direction
- Grade II: over 1mm of movement in F-L direction
- Grade III: over 1mm of movement in F-L direction AND tooth is depressible in the socket

Furcations

Furcations are found on multi-rooted teeth and can be identified clinically.

The Nabers probe is used to measure the depth and extent of furcations.

Radiographs can be used to assist the clinician in diagnosis, but you must still check clinically.

Classification of furcations

- I: incipient bone loss → "slight catch"
- II: moderate bone loss → "definite hook"
- III: advanced bone loss → "through and through"

Commonly multi-rooted include:

Maxillary arch

- Maxillary first premolars (#5, #12) two roots (B, L)
- Maxillary first and second molars (#2, 3, 13, 14) three roots (MB, DB, palatal)

Mandibular arch

- Mandibular first and second molars (#18,19, 30, 31) two roots (M, D)

MGI: Mucogingival involvement

At Pacific, we are simply looking for inadequate attached gingiva. We are defining this as less than 1mm. If you have less than 1mm, even with good homecare some individuals cannot keep sites free of inflammation. (Loe Study)

Diagnosing of Periodontitis:

Using all of the Subjective and Objective findings of your patient, you must now use your clinical judgement as a doctor to diagnose your patient in one of three basic categories (OVERLY SIMPLIFIED):

Gingival Health ← → Gingivitis → Periodontitis

You must look closely at probing attachment loss, probing pocket depths, bleeding on probing, and evidence of radiographic bone loss. In the past, patients with attachment loss were over diagnosed as periodontitis patients and treated as such. However, we now use the **2017 World Workshop Classification of Periodontal and Peri-Implant Diseases and Conditions.**

FOR PATIENTS WITH NO ATTACHMENT LOSS OR BONE LOSS:

Gingival Health on Intact Periodontium:

- No CAL
- 3mm or less pockets (assuming no pseudopockets)
- Less than 10% sites BOP
- No radiographic bone loss

Gingivitis on Intact Periodontium:

- No CAL
- 3mm or less pockets (assuming no pseudopockets)
- 10% or greater sites BOP
- No radiographic bone loss

[If you have 10-30% sites BOP, it is *localized gingivitis*]

[If you have greater than 30% sites BOP, it is *generalized gingivitis*]

Patients with attachment loss and/or bone loss can now be classified as stabilized with gingival health on a *reduced periodontium*, as shown below:

Gingival Health on Reduced Periodontium/Non-Periodontitis Patient:

- CAL present
- 3mm or less pockets
- Less than 10% sites BOP
- Radiographic bone loss possible

Gingivitis if 10% or more sites show BOP

Gingival Health on Successfully Treated Stable Periodontitis Patient:

- CAL present
- 4mm or less pockets (no BOP on 4mm pockets)
- Less than 10% sites BOP
- Radiographic bone loss present

Gingivitis on Successfully Treated Stable Periodontitis Patient:

- CAL present
- 4mm or less pockets (no BOP on 4mm pockets)
- 10% or greater sites BOP
- Radiographic bone loss present

Periodontitis is now classified with a stage and grade. The Criteria is as listed:

1. Interdental detectable CAL at 2 or more non-adjacent teeth OR
2. Buccal or oral CAL 3mm or greater with pocketing 3mm or greater at two or more teeth which cannot be ascribed to non-periodontitis related causes (*i.e Traumatic recession, cervical caries, 3rd molar extraction, endodontic lesion draining, vertical root fracture*)

New Classification based on staging and grading system (similar to oncology):

Staging I-IV based on severity of disease and complexity of case management.

PERIODONTITIS: STAGING

Staging intends to classify the severity and extent of a patient's disease based on the measurable amount of destroyed and/or damaged tissue as a result of periodontitis and to assess the specific factors that may attribute to the complexity of long-term case management.

Initial stage should be determined using clinical attachment loss (CAL). If CAL is not available, radiographic bone loss (RBL) should be used. Tooth loss due to periodontitis may modify stage definition. One or more complexity factors may shift the stage to a higher level. See perio.org/2017wwdc for additional information.

	Periodontitis	Stage I	Stage II	Stage III	Stage IV
Severity	Interdental CAL (at site of greatest loss)	1 – 2 mm	3 – 4 mm	≥5 mm	≥5 mm
	RBL	Coronal third (<15%)	Coronal third (15% - 33%)	Extending to middle third of root and beyond	Extending to middle third of root and beyond
	Tooth loss (due to periodontitis)	No tooth loss		≤4 teeth	≥5 teeth
Complexity	Local	<ul style="list-style-type: none"> Max. probing depth ≤4 mm Mostly horizontal bone loss 	<ul style="list-style-type: none"> Max. probing depth ≤5 mm Mostly horizontal bone loss 	In addition to Stage II complexity: <ul style="list-style-type: none"> Probing depths ≥6 mm Vertical bone loss ≥3 mm Furcation involvement Class II or III Moderate ridge defects 	In addition to Stage III complexity: <ul style="list-style-type: none"> Need for complex rehabilitation due to: <ul style="list-style-type: none"> Masticatory dysfunction Secondary occlusal trauma (tooth mobility degree ≥2) Severe ridge defects Bite collapse, drifting, flaring < 20 remaining teeth (10 opposing pairs)
Extent and distribution	Add to stage as descriptor	For each stage, describe extent as: <ul style="list-style-type: none"> Localized (<30% of teeth involved); Generalized; or Molar/incisor pattern 			

Grading A-C based on risk of progression of disease.

PERIODONTITIS: GRADING

Grading aims to indicate the rate of periodontitis progression, responsiveness to standard therapy, and potential impact on systemic health.

Clinicians should initially assume grade B disease and seek specific evidence to shift to grade A or C.

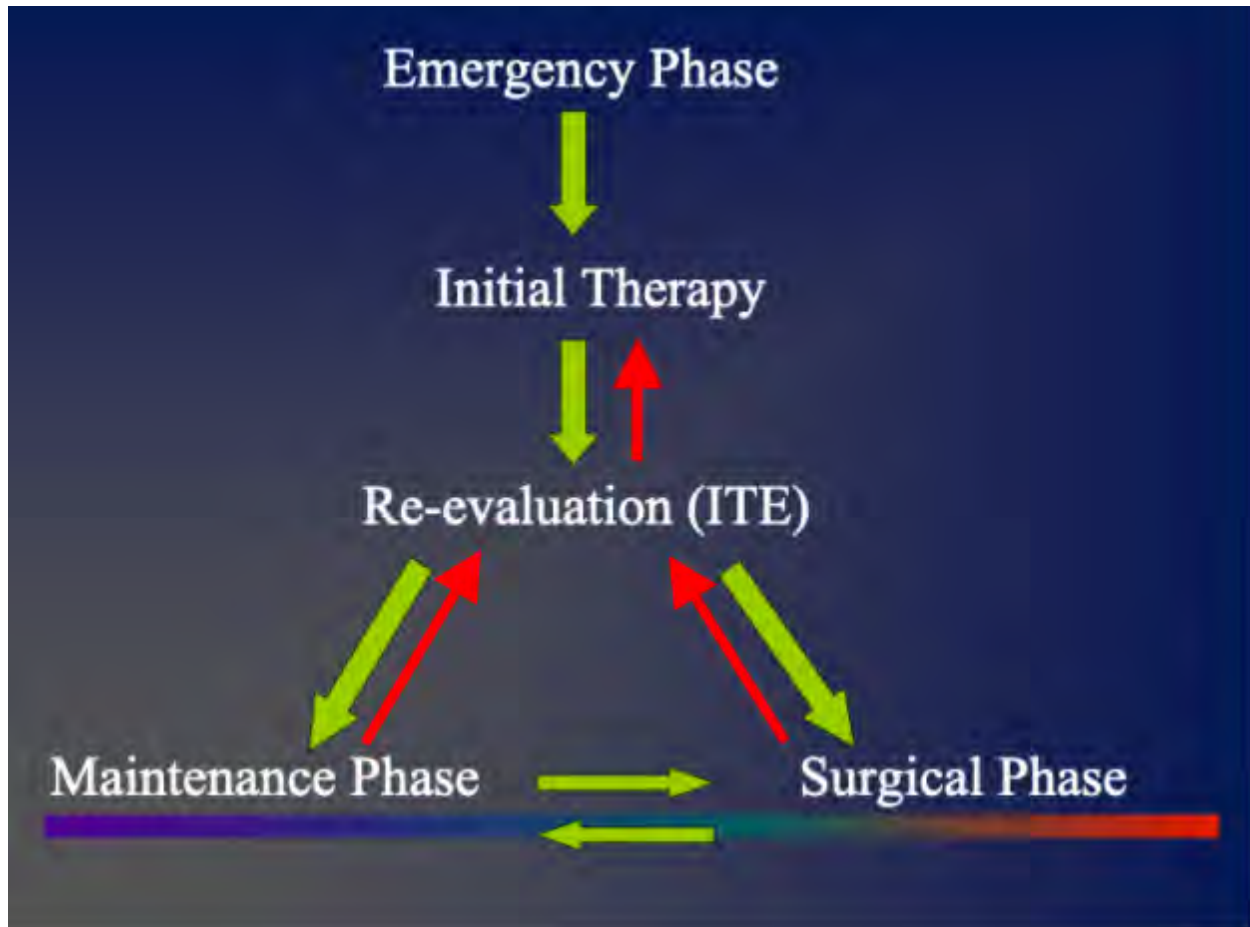
See perio.org/2017wwdc for additional information.

	Progression	Grade A: Slow rate	Grade B: Moderate rate	Grade C: Rapid rate	
Primary criteria <i>Whenever available, direct evidence should be used.</i>	Direct evidence of progression	Radiographic bone loss or CAL	No loss over 5 years	<2 mm over 5 years	≥2 mm over 5 years
	Indirect evidence of progression	% bone loss / age	<0.25	0.25 to 1.0	>1.0
Case phenotype		Heavy biofilm deposits with low levels of destruction	Destruction commensurate with biofilm deposits	Destruction exceeds expectations given biofilm deposits; specific clinical patterns suggestive of periods of rapid progression and/or early onset disease	
Grade modifiers	Risk factors	Smoking	Non-smoker	<10 cigarettes/day	≥10 cigarettes/day
		Diabetes	Normoglycemic/no diagnosis of diabetes	HbA1c <7.0% in patients with diabetes	HbA1c ≥7.0% in patients with diabetes

The 2017 World Workshop on the Classification of Periodontal and Peri-Implant Diseases and Conditions was co-presented by the American Academy of Periodontology (AAP) and the European Federation of Periodontology (EFP).

Treatment planning correctly based on diagnosis and findings:

After gathering all necessary information and performing a differential diagnosis, your next job as a clinician is to treatment plan. The treatment plan of a periodontal patient may be broken up as such:



Emergency phase: Anything that is currently or will soon cause a patient **PAIN** if not treated.

Initial therapy:

1. OHI, extractions and caries control (If necessary)
2. Prophylaxis aka "Prophy"
 - a. "Removal of plaque, calculus, stain from the exposed and unexposed surfaces of the teeth by scaling and polishing as a preventive measure for the control of local irritants"
 - b. Indications:**
 - i. Removal of calcified deposits contributing to inflammation
3. Scaling and Root Planing (Traditional therapy)
 - a. Creating smooth root surfaces was the primary goal initially, but now research shows that bacteria adhere to **both rough and smooth surfaces**.
 - b. "Definitive treatment by which residual calculus and portions of cementum are removed to produce a smooth, hard, biologically acceptable root surface."

- c. Extensive root planing is NOT necessary to obtain healthy tissue
 - i. Use of Ultrasonics can help remove all the bacterial enzymes/by-products
- d. Indications:**
 - i. Removal of supra/subgingival calculus and plaque
 - ii. Reduction of gingival inflammation and promotion of healing
 - iii. Removal of altered cementum
- 4. Periodontal Debridement (New term emerging)
 - a. "Removal of dental plaque, its byproducts and toxins, calculus, and diseased tissue from supra/subgingival and sulcular surfaces"
 - b. Conservation of cementum with a good healing response by control of bacterial infection
 - c. "Gold Standard for treatment of inflammatory Periodontitis"¹⁴

Re-Evaluation (ITE):

1. Following initial therapy, this is where you comprehensively reevaluate all periodontal measurements and plaque index
 - a. Steps 1 and 2 of the ODTP
 - b. Take radiographs if indicated
2. Determine how the patient is responding to initial therapy
 - a. Was the initial therapy enough and is the patient stable to proceed to maintenance therapy?
 - b. Does the patient need to repeat portions of initial therapy?
 - c. Did the patient not respond (good home care, good initial care) and should we progress to surgery?
 - d. Did the patient not respond favorably to good initial therapy with good homecare, and should we now consider surgery?
3. Objectively look at the tissue response changes
 - a. PDs
 - b. CAL
 - c. Mobility
 - d. BOP

Patient may then proceed to either Maintenance Phase or Surgical Phase or to repeat Initial Therapy

Maintenance Phase:

1. **Prophy**
 - a. maintenance recall interval (*Usually 6 months in healthy patients*)
2. **Supportive Periodontal Therapy "SPT" D4910**
 - a. Periodic maintenance recall visits to prevent progression or recurrence of periodontal disease
 - b. Extension of the active periodontal treatment phase
 - c. **Rationales:**

- i. Subgingival scaling of periodontal pockets reducing pathogenic bacterial load
- ii. Subgingival bacterial levels return to pretreatment levels ~2-4 months after subgingival instrumentation

What is the correct recall interval for my patient?

1. SPT every 2 months
 - a. Patients with Stage III-IV with deep pockets who refuse to see Periodontist
 - b. Difficult case with questionable patient cooperation
 - c. History of refractory cases
 - d. Some special needs patients
 - e. Some adult patients undergoing orthodontic therapy
2. SPT every 3 months
 - a. Patients with Stage III who refuse to see periodontist
 - b. Condition too advanced to be resolved with surgery
 - c. Periodontal surgery indicated but not performed
 - d. Early stage disease with marginal or inconsistent oral hygiene
 - e. Pregnant women
 - f. Systemic disease the predisposes to Periodontal disease
 - g. Smokers
3. SPT every 4 months
 - a. Early disease with marginal or inconsistent hygiene
 - b. Moderate disease with excellent hygiene
 - c. Little to no BOP, 4-5 mm PD, good hygiene
4. SPT every 6 months (PROPHY)
 - a. Early gingivitis
 - b. Healthy patients, excellent oral hygiene, light plaque
 - c. Pediatric patients

Some Indications for surgical periodontal therapy

1. Soft tissue cratering at tips of interdental papillae
2. Presence of periodontal pockets
 - a. Deep pockets after good plaque control and root planing
3. Thick rolled osseous ledges
4. Negative osseous architecture (resection)
5. Lack of adequate attached gingiva
6. Hyperplastic gingiva
7. Deep 3 wall defects (regeneration)
8. Class II mandibular molar furcations (regeneration) (other furcas can be attempted but with less predictability)
9. Circumferential defects
10. Some 2 wall defects (Craters) (regeneration or resection)

11. Esthetic concerns
12. Exposed root hypersensitivity or caries problems

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VIDEO LINKS

1. <https://youtu.be/oSRpqQhoouA>
2. https://youtu.be/_xQyZM9vFIE
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