Preferred Process for Eye Examination in Children at District Hospitals

South Sulawesi Province, Indonesia

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(Secondary Level Care)

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A) Registration

- Patient details (Name and Address including parent's information)
- Demographic details (Child: Age, Sex, Education; Parents: Education level, Marital Status, Occupation, Religion, etc.)
- Contact details (Phone Number, E-mail, Communication Address, etc.)
- Referral details (Referring Physician's name and complete address to be noted)

B) Presenting Complaints & History Taking:

- Details of presenting complaints (Chief Complaints, for how long, mode of onset etc.)
- Optical History (Glasses, Patching, etc.)
- Treatment and surgery history (Treating Doctor/ Hospital Name and Date of Surgery/ Treatment, etc.)
- Birth and developmental history (Duration of Pregnancy, Ante natal history of illness/ medications/ addiction, Mode of Delivery, Birth Weight, Whether cried immediately after birth, any significant event during neo-natal period like Asphyxia, septicemia, jaundice, oxygen supplementation, etc.; Developmental milestones)
- History of systemic illness and medication received (Tuberculosis, Nephrotic Syndrome etc.)
- Family History (Any similar eye problems in the family; if yes, who is affected and for how long?)
- History of Trauma or any other ocular illness.

C) Eye Examination:

- Vision assessment (Refer preferred process for vision assessment in children)
  - Vision / Vision with Pinhole
  - Vision with glasses and without glasses if available
  - Previous Glass Prescription / Contact Lens
- Gross torch light examination including pupil
- Intraocular pressure (Steroid users, glaucoma suspects, trauma, post cataract surgeries)/ or as indicated
- Refraction
  - Dry Refraction
  - Cycloplegic Refraction where required (Refer to the Protocol for Dilatation)
- Cover test - Uncover test
- Motility examination
- Note any abnormal/ compensatory head posture
- Slit lamp examination
- Corneal diameter as indicated
- Fundus examination (without dilatation)
- Dilated fundus examination should be performed in:
  - Myopes (>3 Diopters)
  - Strabismus
  - Nystagmus
  - Juvenile Diabetics
  - Floaters of recent onset, flashes
  - Trauma
  - Media opacity

- Unexplained vision loss (best corrected visual acuity <6/12)
- Body weight measurement and height measurement
- Special investigations
  - B-Scan
  - Keratometry
  - A-Scan Biometry
  - Color Vision Test from male child
  - CT Scan as indicated
- Reason to be mentioned for omitting any step and date planned for performing the same to be mentioned.

D) Treatment Details:

- Prescribe spectacles (Refer to preferred process for prescription of glasses)
- Prescribe medicine (Refer AAO's Preferred Practice Pattern/ Government Guidelines in Indonesia)

E) Refer for Tertiary Care:

- Referral Card/ Letter (Refer to preferred process for case referral)

PREFERRED PROCESS FOR VISUAL ACUITY (VA) ASSESSMENT IN CHILDREN

(The method of assessing visual acuity varies according to age of individuals)

DISTANCE VISUAL ACUITY ASSESSMENT

- Patient seated comfortably in the examination chair and appropriate height is adjusted in correlation with Distance Vision chart.
- Vision drum/ chart are evenly illuminated during VA assessment.
- If patient carrying spectacles for distance vision/ task, VA should be assessed while patient wears them (Record as VA with Specs / glasses).
- If required, measure and record unaided VA (without any corrective lenses / glasses) in addition to present glasses.
- Assess VA in Right Eye (RE) first then in Left Eye (LE) while covering the other eye to ensure patient is unable to see with covered eye; establish proper head posture during the procedure.
- Instruct the patient to keep both eyes open and not squint exposed eye; further instruct patient to not turn head nor try to peep through the cover on the other eye.
- If it is suspected that the patient has memorized the letters on a particular line on the vision assessment chart, the patient is instructed to read the letters from right side to left side or different chart is used.

VA Assessment for different age group:

NEW BORN TO THREE MONTHS

- The red reflex should be inspected for lenticular opacity (cataracts), any squint, amblyopia and signs of posterior eye diseases (retinoblastoma)
- Failure of visualization or abnormalities of the red reflex are indications for further detailed examination
- Pupillary reactions to be checked and noted.
- Corneal light reflex should be tested to detect ocular misalignment.
- Blink reflex to be assessed.

NON-VERBAL CHILD (OLDER THAN THREE MONTHS)

- Conduct examination as above
- Visual acuity should be checked with Cardiff Acuity Testing Card/ Lea Peddles, if available.
- Fixation behaviour is examined and for any kind of deviation recorded for each eye as **central, steady** and **maintains.**
- Cover – uncover test should do to check for binocular status.
- Fixation and following are observed with the help of hand held toy or by drawing child's attention to the examiner's face.

VERBAL BUT PRELITERATE CHILD

- Conduct examination as above
- Visual acuity testing with an optotype test (e.g. E Chart, Allen Chart, Kay Pictures, and Lighthouse Symbol Chart & Lea Symbol) should be done with various distances as indicated.

LITERATE CHILD

- Conduct examination as above
- Test visual acuity with Snellen's chart for distance (6 meter / 3 meter in front of mirror) and near (about 1/3 meter)

NEAR VISION

- Room light on / overheads lighting point the near vision test, light should be free from all shadow.
- Allow the patient to hold the Near vision chart/ book at whatever distance he or she feel comfortable to see the smallest print possible. Check the approximate distance and notify in OPD sheet. Vision chart should be held at 40 cm /required near visual distance for any specific work.
- Near VA assessed with spectacles (if any) or unaided.
- Vision for near should be tested monocularly with near vision chart and binocularly if indicated for e.g. Nystagmus

Note: Visual acuity should be assessed every two years until age 10 years, then every three years, thereafter.

PREFERRED PROCESS FOR TORCH LIGHT EXAMINATION

- Examination should be done with room light illumination.
- Torch must be properly illuminated / spot light without shadow.
- Start with Right Eye (RE), then the left eye(LE).
- A complete examination of the skin around eyeballs, external eye structure as well as the conjunctiva, cornea, Iris and pupils should be done, before going for details on slit lamp.
- Observe pupils in room light for size, shape and location.
- Check the papillary reaction in dim room light, distance fixation target set for the procedure. Assess the direct and consensual light reflex. Notify for the same on record.
- Examine the corneal reflex to rule out any misalignment of visual axis.
- Torch Light can also be used as a fixation target for near while doing cover, uncover and alternate cover test.

PREFERRED PROCESS FOR CONDUCTING COVER TEST

- **COVER TEST AT DISTANCE**
  - Use an appropriate target with details (single letter on line above best V/A of worse eye, spot light if V/A < 6/18).
  - Provide proper instruction to the patient to keep fixating the distance target.
  - Align oneself so as not to obstruct the patient's view of the target.
  - Cover totally over eye to prevent peripheral fusion and hold the occluder for about 2 seconds.
  - Perform the alternating cover test followed by cover-uncover test to assesses phoria.
  - Recording the finding. (i.e. Ortho, XT, ET, R/L, L/R, Esophoria, Exophoria, Hyper or Hypophoria).

- **COVER TEST AT NEAR**
  - Use an appropriate target with details (6/9 or one line above best V/A, or spot of light) at 33cm.
  - Same as above mentioned for distance

PREFERRED PROCESS FOR ASSESMENT OF NEAR POINT OF CONVERGENCE

- Use an age appropriate target (line on RAF-rule, pen, illuminated target/toy).
- Explain about the test to the patient and instruct the patient to look at fixation dot or light and maintain single target as long as you can. Ensure that the target is initially single, then move the target towards the patient at a reasonable rate and at an angle of 10-15.
- Determine NPC accurately (sustained double) and verify break point objectively.
- Determine the recovery point.
- Watch for suppression or deviating eye for objective NPC.
- If receded NPC is recorded, it should be confirmed with an alternative test.

PREFERRED PROCESS FOR OCULAR MOVEMENTS EXAMINATION

- Explain the purpose of test and instruct patient correctly.
- Align yourself at eye level of the patient to perform the test.
- Ask patient to fixate at the target (preferably a torch light or an attractive target) and ensure this fixation throughout the procedure.
- Perform the test in a smooth and efficient manner.
- Check for versions (binocular) as well as ductions (uniocular movements).
- Record findings correctly (with the help of light lines for version and dark lines for ductions.

PREFERRED PROCESS FOR REFRACTION IN CHILDREN

- The test is performed in a semi dark room.
- Optometrist/RO needs to position at eye level at specific distance from the patient.
- Trial Frame is adjusted and aligned with IPD of the patient.
- Optometrist should use his/her RE for patient's RE and LE for patient's LE to avoid any induced astigmatic error.
- Provide adequate instructions and an appropriate target (appropriate letter on Snellen's chart or spot of light) to the patient.
- Identify the two meridians and neutralize the movement with the appropriate lens with sphero-cylindrical combination.

- Ensure patient's fixation on target throughout the procedure.
- Adjust the dioptric value of working distance or any altered distance, while doing subjective acceptance.
- Dry retinoscopy for all patients, if any unusual reflex is seen make a note.
- Cycloplegic / dilated refraction if needed with specified indications like:
    - Children less than seven years especially in first refraction.
    - Possible anomaly of muscle balance in which accommodation may be implicated.
    - Hyperopic anisometropia.
    - High astigmatism.
    - High myopia or hypermetropia.
    - Fluctuating reflex.
    - Unco-operative children.
    - Miotic pupil.
    - Scissors shadow.
    - Strabismus.

- Choose the drug as per the required mydriatic and Cycloplegic effect (dilation protocol) after explaining the possible basic contra-indications in mind following the proper instructions.
    - **ATROPINE**

      Most potent Cycloplegic and Mydriatic agents which gives complete Cycloplegia.

      Duration of onset of cycloplegia – 1 to 2 hours.
      Duration of action -- 3 to 10 days
      Used as - 1% ointment or drops twice a day.
      Actual error is 1.0 D < the value obtained.

	0 TO 1 YEARS	1-2 YEARS	2- 3 YEARS	4- 7 YEARS	> 7 YEARS
REFRACTIVE ERRORS WITHOUT STRABISMUS					
MYOPIA	ATROPINE	CTC	CTC	CTC	TPLAIN
HYPEROPIA	ATROPINE	CTC	CTC	CTC	TPLAIN
ASTIGMATISM	ATROPINE	ATROPINE	CTC	CTC	TPLAIN
ESTROPIA					
MYOPIA	ATROPINE	ATROPINE	ATROPINE	ATROPINE	FOGGING
HYPEROPIA	ATROPINE	ATROPINE	ATROPINE	ATROPINE	FOGGING
ASTIGMATISM	ATROPINE	ATROPINE	ATROPINE	ATROPINE	PMT
EXOTROPIA					
MYOPIA	ATROPINE	ATROPINE	ATROPINE	CTC	T PLAIN
HYPEROPIA	ATROPINE	ATROPINE	CTC	CTC	T PLAIN
ASTIGMATISM	ATROPINE	ATROPINE	CTC	CTC	PMT

    - **TOXIC REACTION:**
        - Diffuse cutaneous rash
        - Congestion and chemosis of eye
        - Thirst
        - Mild to moderate fever
        - Tachycardia
        - Urinary restriction
    - **HOME ATROPINE**
        - Provides complete cycloplegia within 20-30 minutes and lasts for 1-3 days.
        - Actual error is 0.75 D < the value obtained.
    - **CYCLOPENTOLATE**

- Provides complete cycloplegia with faster onset and faster recovery.
- Provides a moderate and variable mydriasis.
- Used as 0.5% eye drops for infants and 1.0% eye drops for children above 1 year.
- Actual error is 0.75 D < the value obtained.

- **TROPICAMIDE**
  - Drug with shortest acting cycloplegia equivalent to HA.
  - Effect achieved is highly variable in extent and duration.

- **CANNOT BE TRUSTED FOR CYCLOPLEGIA IN CHILDREN**
  - Explain the patient about the waiting time and the toxic reactions with duration of the drug, before going for it.
  - Use refining methods for the subjective acceptance (cross cylinder and Duochrome test) as and when required.
  - Use fogging techniques for all young Hyperopes while doing PMT.
  - Check for the near addition monocular and binocularly at the required distance
  - Check the previous glasses power and compare it with the new correction for any abrupt change.
  - Check for binocular status (worth four-dot test) as and when required.
  - Give the walk-in trial with the correction in trail frame for high astigmatic and anisometropic patients to check for any distortion and diplopia.

PREFERRED PROCESS FOR PRESCRIBING REFRACTIVE CORRECTION

- **As per the following American Glass Prescription Guidelines:**

CONDITION	DIOPTERS			
,	AGE 0-1 YEAR	AGE 1-2 YEAR	AGE 2-3 YEAR	AGE4-7 YEAR
ISOMETROPIA (SIMILAR REFRACTIVE ERROR IN BOTH EYES)				
MYOPIA,	> - 5.00D	> - 4.00D	> - 3.00D	FULL CORRECTION
HYPEROPIA,	> + 6.00D	> + 5.00D	> + 4.50D	MANIFEST REFRACTION
ASTIGMATISM,	> 3.00D	> 2.50D	> 2.00D	MANIFEST REFRACTION
ANISOMETROPIA (DISIMILAR REFRACTIVE ERROR IN BOTH EYES)				
MYOPIA,	> - 2.00D	> - 2.00D	> - 2.00D	> - 2.00D
HYPEROPIA,	> + 1.00D	> + 1.00D	> + 1.00D	> +1.00D
ASTIGMATISM,	>1.50D	>1.50D	>1.50D	> 1.50D
EXOTROPIA (ISOMETROPIA)				
MYOPIA	FULL CORRECTION	FULL CORRECTION	FULL CORRECTION	FULL CORRECTION
HYPEROPIA	> +3.00D	> + 2.50D	FULL CORRECTION	MANIFEST REFRACTION
ASTIGMATISM	> 3.00D	> 2.50D	FULL CORRECTION	MANIFEST REFRACTION
ESOTROPIA (ISOMETROPIA)				
MYOPIA	FULL CORRECTION	FULL CORRECTION	FULL CORRECTION	FULL CORRECTION
HYPEROPIA	FULL CORRECTION	FULL CORRECTION	FULL CORRECTION	FULL CORRECTION
ASTIGMATISM	FULL CORRECTION	FULL CORRECTION	FULL CORRECTION	FULL CORRECTION

- **HYPERMETROPIA**
  - A normal child below 7 years of age has physiological hypermetropia, so give correction only if error – in infants more than 3 D.
  - In pre-school children more than 2.5D.
  - Prescribe any full correction by reducing working distance for accommodative squint.
  - Prescribe correction if any error by reducing working distance and drug effect for the patients with symptoms of sub-normal visual acuity/ocular fatigue.

- **MYOPIA**
  - Prescribe correction if error – In infants and toddlers more than 1.5D.
  - In preschool children more than 2.5 D.
  - Part time wear may be advised in low myopes.
- **ASTIGMATIC ERROR**
  - Prescribe correction if error – below 3 years more than 2 D. - Above 3 years more than 0.5D.
  - For initially prescribing high cylinders, take help of spherical equivalent.
  - May use auto refractometer for verifying axis.
- **ANISOMETROPIA**
  - Prescribe entire correction.
  - Contact lens may be advised to reduce anisokonia.
  - Make a note of your opinion about the new correction like:
  - Continue the old glass.
  - Prescribe – constant, bifocal, progressive.
  - Mention for the material and size of the frame.
  - Mention for any special tint, if required.

PREFERRED PROCESS FOR PRESCRIBING GLASS

- **SPHERE MYOPIA FIRST TIMER (PLANO -> -0.75)**
  - If patient does not complain minus power lens power should not be prescribed minus power lens. If the patient demands the minus power lens, give them the least necessary to satisfy their need for distance only.
  - Don't prescribe minor change (less than 0.50 Diopter)
  - Try to avoid changing cylindrical axis more than 10 Degree. If still changes are required:
    - A greater change must be made, after letting the patient walk around wearing the prescription in a trial frame.
    - Explain the approximate adaptation time and initial glass problem
    - After writing the final eyeglass prescription, make sure it is duo chrome balanced and document it on the patient's medical records file.
    - Let the patient walk around in clinic / waiting room to see if the prescription might be questionable or if it is first time wearer or any major change more than 0.50 Diopter.
    - For adult myopic patients, around or over the age of 40 years, make sure that the increasing minus power lens does not induce presbyopia symptom.
    - Check if that patient can read comfortably with the new glass prescription.
    - New astigmatic correction in adults, if measurable acuity is improved
    - Prescription is released after following verification
    - Duo chrome balance
    - Cylinder verify with JCC
    - Compare with old glasses for distance and near, both. (If patient feels any major difference.)

- **IN THE GLASS PRESCRIPTION MENTION ALL THE FOLLOWING DETAILS:**
  - Patient's Name, MR No., Date,
  - Refraction values for both eyes
  - BCVA (Distance & Near)
  - Vertex distance (more than 5.00 Diopter)

- Mention Lens design, material, if recommended.
- Mention coating or tint, if recommended.

Tolerance on Cylinder Axis

0.25D to 0.75D	+/- 5^0
> 0.75D to 1.50D	+/- 3^0
> 1.50D	+/- 2^0

PREFERRED PROCESS TO MEASURE INTRAOCULAR PRESSURE (IOP) WITH SCHIOTZ**

- Inform the patient about checking intraocular pressure(IOP) of their eye which involves administering eye drops.
- Clean the instrument (wipe the probe with pre-soaked alcohol or spirit and wait for at least 30 seconds for probe to get dry before examination).
- Anaesthetic drop instilled in cul-de-sac. Ask the patient NOT to rub or press on their eye.
- Instruct the patient about fixation during the process of another eye as well.
- Take the reading from the instrument and document.

INSTRUCT THE PATIENT

- To relax, maintain position
- Hold the eye open wide
- Explain that the probe will "come very close to the eye" (Do not deny the probe will touch the cornea, if patient asks)

DO & ASSURE

- Contact Lenses are removed
- Make sure patient is comfortable

DON'T DO IF

- Any ocular infection, corneal abrasion or corneal staining
- Epidemic corneal infection
- Any recent ocular trauma especially perforating injury
- Significant corneal scar or distortion

****Change of current practice for IOP measurement in children is highly recommended to Gold Standard (Applanation/ Parkins/ iCare).**

PREFERRED PROCESS FOR POST INTERVENTION FOLLOW UP

- **Refractive Error:**
  - During first follow-up immediately after spectacle dispensing to check the glass power, quality and compatibility.
  - Second follow-up usually after 6 months of dispensing spectacles but it varies depending upon the age of child, degree of refractive error and presence of amblyopia. If amblyopia is present, second follow-up should be done after 3 months.
  - Follow-up for children above 9 years should be done once in 9 months.
  - Follow-up for children above 12 years should be done at least once a year.

- SOS follow-ups if floaters or flashers are seen or there is a drop in visual acuity in either eye.

- **Amblyopia**
  - After correction of the causes (spectacles, cataract surgery, squint correction etc) follow-up after 3 months.
  - If visual acuity difference between the eyes is more than 2 lines of Snellen, patching of the eye according to the density of amblyopia and follow-up after 3 months.
  - After 3 visits, with good compliance if there is no improvement in vision - Stop patching.
- **Ocular allergy**
  - Allergic conjunctivitis – Treat with artificial tears and any mast cell stabilizer
  - Treat for 2-3 months. Follow-up in case of recurrence.
  - Viral Kerato-conjunctivitis -
    i. Treat with mast cell stabilizer, soft steroid only for limited period, artificial tears and cold compression.
    ii. The parents should be counselled about – safe use of steroid and importance of regular follow up.
    iii. If steroid is used – initial follow up after 2 -3 weeks for measurement of IOP. Subsequent follow ups are dependent on severity of the case.
    iv. In every visit IOP should be measured including a comprehensive eye examination.
- **Chronic Nasolacrimal Duct Obstruction (CNLDO)**
  - If child is less than one year old only sac massage. If signs of infections are there, treat with anti-biotic, preferably Tobramycin along with the sac massage.
  - Follow up after 1 month, to see improvement. If massaging technique is found faulty, re-educate the mother and follow up after one month. If there is improvement, follow up after two months.
  - If it does not resolve, wait until one year for probing between one to one and a half years.
- **Cataract Surgery**
  - Post-operative drugs
    i. Moxifloxacin/ Levofloxacin Eye Drop – Every six-hourly for 7-10 days.
    ii. Prednisolone Eye Drop -
      1. Every four hours - First week
      2. Every six hours - Second week
      3. Every eight hours - Third week
      4. Every twelve hours - Fourth Week
      5. Once a day - Fifth week

    iii. Homatropine (2%) Eye Drop -
      1. First week - Every 8 hours
      2. Second week - Every 12 hours (if required)
  - Hospitalization: Discharge on third post-operative day.
  - Follow-up schedule:
    - 3 days after discharge at District Hospital
    - At 1 week, 2 weeks, and 1 month after surgery
    - Every 3 months until one year of surgery.
    - Every 6 months till refraction stabilizes second year onwards.

- At every follow-up visit after one month post-surgery, refraction and IOP measurement has to be done.
- Spectacles prescription after one week of surgery.

- **Non-penetrating Ocular Trauma**
  - First follow-up visit : Comprehensive eye examination to see if there is any hyphema, iritis, lens problem and retinal problem.
  - Second follow-up visit : After 1 week
  - Subsequent follow-up visit: According to ocular condition, If no symptoms, once in 6 months for comprehensive eye examination.

PREFERRED PROCESS FOR CASE REFERRAL

1) What – Diseases listed below.

- Cataract < 8 years
- Traumatic Cataract
- Sub-luxated Lens
- Strabismus
- Glaucoma
- Pathological Myopia
- Retinopathy of Prematurity
- Retinoblastoma
- Cortical Vision Impairment
- Complicated Low Vision Cases (Multiple Disability, MR etc.)
- Corneal Ulcer (Not responding to treatment)
- Endophthalmitis
- Chronic Uveitis
- Lid Surgeries
- NLDO – for DCR
- Major Trauma

2) **When** – When treatment is beyond the capacity of district hospital

3) **Where** – UNHAS (Tertiary care)

4) **How** – Coordination between Districts & UNHAS.
   - Designate persons in each centres to co-ordinate between hospitals.
   - Develop an IT based referral system.
   - Completing formalities at district level before sending to UNHAS.

5) Tracking
- Correct and full contact details.
- Link with IT based system.
- Telephonic communication.
- Ensure follow up though counseling and maintaining contact and giving feedback to UNHAS about the final outcome.

6) Issues related to follow-up and referrals
- Minimizing the number of visits
- Minimizing the cost of treatment
- Making services available under one roof
- Feedback to treating doctors (both-ways) to minimize referral.