Third World Surgical Volunteerism and Spine care

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Author’s Disclosure Information

Oheneba Boachie-Adjei, MD
DePuy Spine, (a,b)
K2M, (a,b,c,d)
Osteotech (a,b)
Trans 1 (a,b,c)

a) Grants/Research Support
b) Consultant
c) Speakers’ Bureau
d) Other Financial Support

CORPUS HIPPOCRATICUM
GROUP OF BOOKS
460 BC

“Whatever houses I may visit, I will come for the benefit of the sick, remaining free of all intentional injustice, of all mischief...”

Uphold the values of relieving suffering and caring for people without regard to personal gain

Upon graduation, many medical students take a modern version of the oath written by Louis Lasagna in 1964.

• “I will remember that I remain a member of society, with special obligations to all my fellow human beings, those sound of mind and body as well as the infirm”.

Academic Dean of the School of Medicine at Tufts University.
World Health

- Two thirds of the world’s 6 billion persons live in countries defined as "developing"
- Approximately half of the world's population lack access to adequate primary health care

Healthcare Market – Highlights

- Increasing morbidity prevalence among poor
- Increasing incidences of AIDS, Hypertension, Diabetes, CAD, Cancer
- Inadequate medical manpower – result of brain drain

<table>
<thead>
<tr>
<th>Country</th>
<th>No. of doctors per 100,000 population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ghana</td>
<td>4</td>
</tr>
<tr>
<td>Malaysia</td>
<td>43</td>
</tr>
<tr>
<td>India</td>
<td>48</td>
</tr>
<tr>
<td>China</td>
<td>115</td>
</tr>
<tr>
<td>USA</td>
<td>245</td>
</tr>
<tr>
<td>Germany</td>
<td>319</td>
</tr>
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Portuguese Images from 17th & 18th century
• Approximately two thirds of the world’s population lack adequate orthopaedic care and essential radiological services.

• Increased trauma-related injury will add to the already substantial burden of musculoskeletal disease throughout the world.

• This problem is compounded in the developing world by a lack of trained medical personnel, a lack of medical facilities, and, in many regions, an inability to access existing facilities.
The global Burden of Musculoskeletal Disease

- Predominant conditions
  - Traumatic injuries
  - Neglected congenital deformities
  - Sequela of Infections
    - Osteomyelitis
    - Polio
    - Tuberculosis
    - Leprosy

Bone and Joint Decade 2000-2010
The United Nations, the World Health Organization and 37 countries

- This global initiative is intended to improve the lives of people with musculoskeletal disorders, such as arthritis, and to advance understanding and treatment of musculoskeletal disorders through prevention, education and research.

Legends Of Volunteerism

- "I don’t know what your destiny will be, but one thing I do know: the only ones among you who will be really happy are those who have sought and found how to serve."
- Nobel prize laureate, Albert Schweitzer,
SRS, NASS, POSNA, GOP programs serving an acute need OUS.

- Foster the development of regional, self-sufficient spine centers staffed by local physicians capable of providing continuing care to patients with spinal disorders.
- Excellent and Relevant Care

FOCOS GHANA MISSION VOLUNTEERS - 1998-2009
TOTAL VOLUNTEERS 184

<table>
<thead>
<tr>
<th>Year</th>
<th># of volunteers</th>
<th>Volunteers Served</th>
<th># Served since 1998</th>
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<tr>
<td>2009</td>
<td>60 (est.)</td>
<td>Surgeons</td>
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<tr>
<td>2008</td>
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<tr>
<td>2007</td>
<td>59</td>
<td>Anesthesiologists</td>
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<td>2005</td>
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<td>Psychiatrists</td>
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<td>2003</td>
<td>22</td>
<td>Neurophysiologists</td>
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<td>2002</td>
<td>16</td>
<td>Physical Therapists</td>
<td>12</td>
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<tr>
<td>2001</td>
<td>5</td>
<td>Orthotists</td>
<td>4</td>
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<tr>
<td>2000</td>
<td>11</td>
<td>Physician Assistants</td>
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</tr>
<tr>
<td>1999</td>
<td>7</td>
<td>Surgical Tech</td>
<td>7</td>
</tr>
<tr>
<td>1998</td>
<td>3</td>
<td>Medical Students</td>
<td>9</td>
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<tr>
<td></td>
<td></td>
<td>Manufacture Reps.</td>
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<td></td>
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<td>Research</td>
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<tr>
<td></td>
<td></td>
<td>Non-Medical</td>
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FOCOS GHANA OPERATING ROOM ACTIVITY
1998- June 2009
(501 patients)

<table>
<thead>
<tr>
<th>SPINE SURGERIES</th>
<th>DIAGNOSIS</th>
<th># CASES</th>
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<tr>
<td>Scoliosis</td>
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<tr>
<td>Spondylolisthesis</td>
<td>23</td>
<td></td>
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<tr>
<td>Spinal Stenosis</td>
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<tr>
<td>Kyphosis</td>
<td>76</td>
<td></td>
</tr>
<tr>
<td>Kyphoscoliosis</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>Lumbar Stenosis</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Spondylosis</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>48</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>JOINT REPLACEMENTS</th>
<th>DIAGNOSIS</th>
<th># CASES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degenerative arthritis hips/knees</td>
<td>148</td>
<td></td>
</tr>
</tbody>
</table>

FOCOS GHANA OPERATED PATIENTS'S AGE
1998- June 2009

- 70 yrs.+ 9%
- 60 yrs.-70 yrs. 11%
- 50 yrs.-60 yrs. 7%
- 40 yrs.-50 yrs. 11%
- 30 yrs.-40 yrs. 17%
- 20 yrs.-30 yrs. 18%
- 10 yrs.-20 yrs. 17%
- <10 yrs. 10%
FOCOS programs serving an acute need

- **Excellent**
  - State of being Superior
- **Relevance**
  - “Applicability to real world Issues, present day events or current state of society, as being more useful, more suitable and more desirable in the present situation”

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SGM: 5F (ET)

- Height: 98cm
- Weight: 16kg
- Medical History: None
- Neuro: Normal
- Diagnosis: Early Onset Scoliosis
- Radiographs:
  - T1-T4 Left Curve 75° (22°)
  - T4-T10 Right Curve 88° (25°)
  - T10-S1 Left Curve 42°
  - Kyphosis 42°
  - Lordosis 45°

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1yr Post-Op Lengthening
DOS: 11/21/2010

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Excellence

SRS GOP Ethically Progressive Improved Care

Relevance
Case of combining Excellence with Relevance

- 8YF Scoliosis
- Poor PFTs, No family support for complex def. care
- In a village with no orthopedist
- Needs complex def surgery, but How?

PSF strategic screw placement.

Treatment Options?
1. PSF only
2. ASF/PSF to prevent crankshaft
   All pedicle screws without intra op Xrays or Flouo
   No CT Scan or MRI NO assess spinal canal
   Attempted Thoracotomy failed and case aborted

4 years post op
What is Best, Relevant and Ethical?

- 14YM
- Height: 148 cm
- Weight: 19 kg
- Kyphoscoliosis
- T3-T12 = 140, K= 115, L=95
- 6months nutritional support

Treatment Options?

- PSF /VCR
  - Minimal blood products
  - IOM available
  - Poor PFTs
- ASF/PSF
  - No time to stage

Procedure: PSF Rib Osteotomies, Thoracoplasty
T2-L2 Pedicle screw

2 years post op

TB Spondylitis- A ravaging disease and its resurgence
More commonly encountered by SRS GOP programs
in underserved countries

Global Tuberculosis Control 2009
Epidemiology Strategy Financing
Tuberculous Spondylitis: Where are we today in the surgical management and is there a role for spinal instrumentation in these infections

Surgical Techniques

• Anterior procedures:
  – Mostly in the presence of epidural extension of abscess with neurologic compromise
    • Thoracotomy or thoracoabdominal approach
    • Retroperitoneal approach is indicated for evacuation of Psoas abscess

• Combined anterior posterior procedures
  – Indicated for spinal instability of all 3 columns with associated deformity
  – When posterior stabilization is needed in addition anterior debridement or evacuation of psoas abscess

M.J. 9M, TB kyphosis
Procedure: PSF/PVCR T2-L3, Anterior fusion with Harms Cage.

Post op XRs
Older 24 YF TB kyphosis with pain and Hyperreflexia

Post-Op PVCR

PVCR for Kyphosis and Kyphoscoliosis FOCUS Series

- Post-operative complications (19%)
  - Pseudoarthrosis (3)
  - Implant failure/dislodgement (4)
  - Neurologic sequelae (2)

No permanent Cord deficit deficit.
PVCR for Kyphosis and Kyphoscoliosis – FOCOS Series

- 56 Adult and peds pts: PVCR
  - Congenital kyphoscoliosis (22)
  - Tuberculosis of the spine (34).
- Pre-operative neurologic deficit 27% (15/56)
- Intra-operative spinal cord monitoring complications occurred 13%


- Results: 9 (2.0%) deep infections including 5 in pediatric patients (avg age 17, 9-20 yrs.) and 4 adult patients (avg age 50, 44-58 yrs.).
- Diagnoses included kyphosis 3/69, scoliosis 3/140, DDD 2/59, and spondylolisthesis 1/23.
- 6 were acute and 3 were late.
- All late infections needed implant removal and antibiotics.
- 8 posterior surgeries and 1 combined anterior/posterior surgery.
- There were no deaths related to the infections.

Mortality and Morbidity in 447 patients FOCOS Review 1998-2010

- Death 6 (1.3%)
  - Intra op 3
  - Post op 1
  - Late post op 2
- Neuro (Cord) 9 (2.01%)
  - Permanent 5 (1.1%)
  - Recovered 4 (0.89%)
19F congenital Kyphoscoliosis

Procedure: PSF T1-L2, Osteotomy (SPO) T7-T12, Thoracoplasty
EBL: 1500cc (cell saver 477cc,) total transfusion 2units

- Monitoring change: SSEP & MEP reduced to 0% of baseline,
- Interventions- raising BL pressure, steroid protocol, removal of wire. 0% on L, 100% on R recovered in SSEP. 0% on L, 75% on R recovered in MEP. Continued surgery
- Wake up test: Neurologic Deficit 3/5 motor, Progressive deficit in 36 hrs
- Decompression T4-T8 3 days post op
- Full recovery in 4 weeks

Decompression T4-T8 3 days post op
Pre and Post Op

Diagnosis: 34 F post Polios with progressive deformity and Pain
PFT 55%

Surgical Treatment of Severe Scoliosis: Best Practices, Complications and Efficacy of Combined Anterior/Posterior vs Posterior Procedures
Options: A/P fusion, PVCR, PSF, SPO

Procedure: Staged ASF PSF: IOM changes
5 years post op

5 years post op
Surgical Treatment of Severe Scoliosis: Best Practices, Complications and Efficacy of Combined Anterior/Posterior vs Posterior Procedures

Diagnosis: 10 F Congenital Kyphoscoliosis
Previous tethered cord release
PFT 28% FVC

PSF T3-L4, T5-T9 R.thoracoplasty, Concave rib osteotomies, with intra-operative Halo and skin traction
EBL: 1200 ml, cell saver 350 ml, Dural tear.
2 week ICU stay
The foundation has introduced a world of difference ...

- Barbados
- Burkina Faso
- Ethiopia
- Ghana
- Ivory Coast
- Nigeria
- Poland
- Sierra Leone
- Spain
- Togo
- United Arab Emirates
The FOCOS program of capacity building in Ghana

- Renewed interest for orthopedics surgery in the residency program and formation of local Orthopedic society
- First Ghanaian fellowship trained spine/scoliosis surgeon from HSS
- FOCOS – CURE Ghana Clubfoot program

Education and Capacity Building Mission

- Centers of excellence for Complex Spine and Orthopedic Care
- Residency and Fellowship Training
  - Support from international rotating faculty for care and training

The Planning Game

Guest House

The future

Just completed 50 Bed FOCOS Orthopedic Hospital in Ghana
The Endurance Program

Bravery & Resilience

Walking the tight Rope

What to do in your Darkest hour
• Improvisation and Rapid cognition

- Early recognition is a problem in underserved areas
- No Option for casting/Bracing
- Lack of sophisticated implants may compromise care
- Periodic surgeries not well tolerated by patients from long distances to a central location
- Multidisciplinary care unavailable for complex co-morbidities
- High Complication with repeat surgeries not tolerated

ISSUES TO ADDRESS

FOCOS Bidirectional Growth Modulation (FBGM)

- Rational
  - One time Surgery till Final Fusion
  - Reduce Repeat surgery complication
  - Utilize Natural Growth of Spine
  - Option for Dual Rod Conversion (Distraction)
  - Option for Apical Fusion Conversion (Shilla)
  - Limit Cost Associated with Distance travel and Post op casting
Pre-Op Photos: Ayele Wendemeneh Yibetal

- AY 6M: Diagnosis: Early Onset Scoliosis
- Curve: 75 deg Left Thoracic, 40 deg Right Lumbar

Pre-Op x-rays: Ayele Wendemeneh Yibetal

- Date: 3/1/2011
- Procedure: Limited PSF (T2-L3), FBGM
- Implants: 5.5mm co chr, Wedding Bands x2, Rods x4, Wires x2
- EBL: 150 cc
- Transfusion: None
- Surgical time: 150 min
- Spinal Cord Monitoring: SSEPs, TcMEPs
- Complications: None

Operative Notes: Ayele WY

Intra-Op Photos
FOCOS Crash Course

The Outcomes of Combining Excellence with Relevance

TO VOLUNTEER OR CONTRIBUTE: www.orthofocos.org