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Improving Athletic Performance in Athletes with ID/DD

BETTER, FASTER, STRONGER

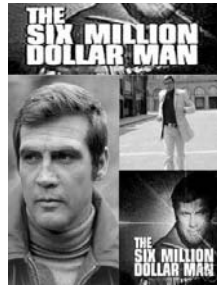
Special Olympics

- A worldwide sports movement involving nearly 3 million athletes in almost 200 countries.
- A worldwide social movement promoting respect and equality for people with intellectual disabilities.
- A worldwide health movement advocating for health parity for people with intellectual disabilities

Steve Austin

Ocular Implant
Improved Leg Strength
Improved Arm Strength

See Better
Run Faster
Throw More Accurately



Sports and Divisions

- Alpine Skiing
- Aquatics
- Athletics
- Badminton
- Basketball
- Bowls
- Bowling
- Cricket
- Cross Country Skiing
- Cycling
- Equestrian
- Figure Skating
- Floor Hockey
- Football
- Football (Soccer)
- Golf
- Artistic Gymnastics
- Rhythmic Gymnastics
- Judo
- Karate
- Netball
- Paralympic
- Roller Skating
- Sailing
- Snowboarding
- Snowshoeing
- Softball
- Special Skating
- Table Tennis
- Team Handball
- Tennis
- Unified Sports
- Volleyball

Adrienne

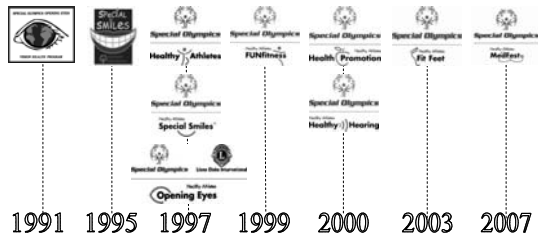
- Bilateral Optometric Enhancement
 - 5 x vision
- Bilateral Auditory Enhancement
 - 2 x hearing
- Vagus Nerve Stimulator
 - Seizure Resistant
- Enhanced Diet and Medications
 - Bones are becoming stronger
- Physiotherapy
 - Affecting Balance, Strength, Coordination



Healthy Athletes



Chronology



People with Intellectual Disability



Motor impairment	20-30%
Seizure disorders	15-30%
Vision impairment	up to 25%
Hearing impairment	up to 32%
Behavioral disorders	15-35%

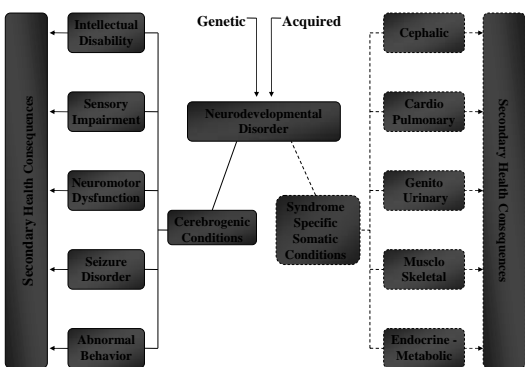
Healthy Athletes



- 636 screenings
- 56 countries
- 149,460 athletes:
 - Dentistry - 31,386
 - Optometry - 29,892
 - Physical Therapy - 23,914
 - Health Promotion - 20,924
 - Audiology - 16,441
 - Podiatry - 14,946
 - Medical Exams - 11,957

Better, Faster, Stronger

Sensory Impairment	Neuromotor Dysfunction	Seizure Disorder	Syndrome Specific	Secondary Consequences
Vision	Range of Motion	Risk Reduction	Cardiac Defects	Obesity
Hearing	Balance		AAI	Bone Loss
	Strength		Collagen Disorders	Oral Health
	Flexibility			Podiatric
				Medication Effects



Better, Faster, Stronger

- Sensory Impairment
- Vision
- Hearing



Opening Eyes

- Provides visual screenings
- Provides sunglasses to athletes
- Provides corrective eyewear
- 33% fail eye health
 - (Estimate 1/3 serious)
- 65% not examined in 3 years
- 26.7% not seeing 20/40
- 37% need glasses or protective eyewear



FUN Fitness

- A Fitness Screening
- Flexibility, strength, balance, and aerobic condition
- 58% needed improvement in balance
- 15% needed improvement in flexibility
- 20% needed improvement in strength
- 22% needed referral to a physical therapist



Healthy Hearing



- Provides hearing screenings
- Provides hearing aids to athletes
- 20.5% threshold losses
- 16.5% showed a conductive/mixed loss
- 3.5% require hearing aids

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Seizure Disorder

Risk Reduction

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Neuromotor Dysfunction

Range of Motion
Balance
Strength
Flexibility



Seizure

- 15-30% of Athletes
- Affects sports such as:
 - Sailing
 - Swimming
 - Diving
 - Cycling
 - Equestrian



Seizure

Seizure threshold maybe be lower in the presence of:

- Increased adrenal activity
- Decrease in sleep
- Increased core temperature
- Electrolyte imbalances
- Decrease in antiepileptic medications
 - Forgot pills
 - Intentionally decreased doses during training and/or games



Sudden Athletic Cardiac Death



About 1 in 2800 people will die due to SACD

1 death per 50,000 to 375,000 exercise hours

ID population risk is unknown (Special Olympics logs at least 120,000,000 exercise hours, worldwide)

Most causes are detectable

Once cardiac arrest has occurred the chance of survival decreases by 10% every minute the heart is stopped.

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Syndrome Specific

Cardiac Defects

AAI

Collagen Disorders

Cardiac Defects



Down Syndrome – 40-50% cardiac defect rate

Fetal Alcohol Syndrome – 29-41% cardiac defect rate

Fragile X – up to 52% cardiac defect rate

Turner Syndrome – up to 50% cardiac defect rate

William Syndrome – up to 75% cardiac defect rate

Syndrome Specific Conditions

- Cardiac Disorders
 - Hypertension
 - Coarctation
 - Structural Defects
 - Long QT Syndrome
 - (drug induced)
- Atlanto Axial Instability
- Collagen Disorders



Syndromes Associated with Structural Heart Defects

Adams-Oliver	Ehler-Danlos Syndrome	Kearns-Sayre Syndrome	Townes-Brocks
Allagille Syndrome	Eisenmenger Syndrome	Laurence-Moon-Biedle	Treacher Collins Syndrome
Apert Syndrome	Elis Van Crevald Syndrome	Leopard Syndrome	Tuberous Sclerosis
Cantrell Syndrome	Emery-Dreifuss Dystrophy	Marfan Syndrome	Turner Syndrome
Carpenter Syndrome	Fanconi Anemia	Mucopolysaccharidosis	VACTERL Syndrome
Cayler Syndrome	Farber Syndrome	Muscular Dystrophy	VATER Syndrome
CHARGE Syndrome	Fetal Alcohol Syndrome	Osler-Weber-Rendu	Velo-Cardio-Facial Syndrome
Congenital Rubella	Fragile X Syndrome	Progeria	Von Hippel Lindau Syndrome
De Lange Syndrome	Friedreich Ataxia	Scimitar Syndrome	William-Beuren Syndrome
Dejerin-Soltas	Hemorrhagic Telangiectasia	Shores Syndrome	Williams Syndrome
DiGeorge Syndrome	Heterotaxy Syndrome	Shprintzen Syndrome	Wolf-Parkinson-White
Down Syndrome	Holt-Oram Syndrome	Smith Magenis	Zellweger Syndrome
Dubowitz Syndrome	Ivemark Syndrome	Smith-Lemli-Opitz	
Edwards Syndrome	Kartagener Syndrome	TAR Syndrome	

Atlantoaxial Instability (AAI)



Instability of the Atlantoaxial (C1-C2) joint

Approximately 15% of people with Down syndrome

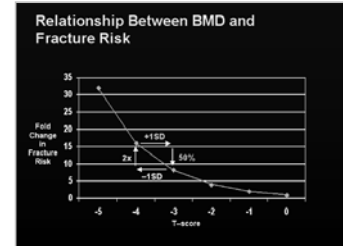
- 13-14% Asymptomatic
- 1-2% Symptomatic

Symptomatic AAI is correlated with spinal cord injury

Osteopenia/Osteoporosis

20%

The percentage of Special Olympics athletes (average age 24) with low bone density



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Secondary Consequences

- Obesity
- Bone Loss
- Oral Health
- Podiatric
- Medication Effects

Special Smiles

- Provides dental screenings
- Provides mouth guards for athletes in contact or high-risk sports



- 12% in active dental pain
- 35% had untreated dental decay
- 50% had gingival signs



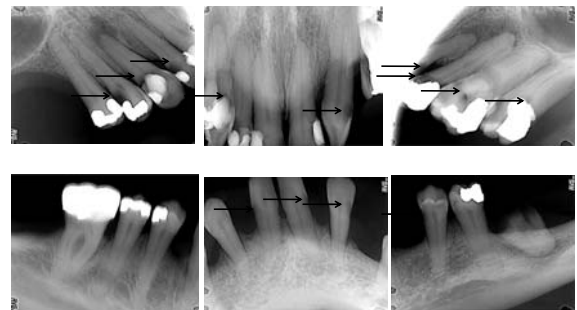
Health Promotion

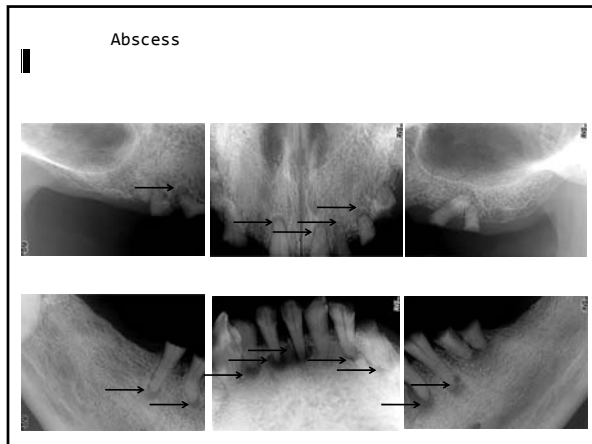


- Provide and reinforce healthy lifestyle information to athletes and families
- Establish best ways to shape lifestyle choices; promote health literacy of persons with ID
- Provide both games-based and community based opportunities for Health Promotion

- 56% are overweight
- 5% use tobacco products

Decay





Medication Risks

- Bone Loss (31%)
- Long QT Syndrome (5%)
- Weight Gain (28%)
- Constipation
- Sun Sensitivity (23%)
- GERD
- Caries
- Xerostomia
- Stomatitis

Fit Feet

- Provides screenings of the feet and ankles
- Assesses the correctness of footwear
- Provides community referral as needed

- 51% of females and 59% of males are wearing the wrong size shoes!!
- 25% had ingrown toenails
- 11% had athlete's foot

Medication Risks

- Balance and Coordination
- Hyperthermia
- Dehydration

MedFest

- Provides a free sports physical and other health screenings to any potential Special Olympics athlete
- Provides referrals to community health providers

- 25% are taking medications which can negatively impact the athletic experience
- 22% had at least one previously undiagnosed medical condition

SPECIAL OLYMPICS			HEALTH HISTORY			MEDFEST									
Athlete Name: _____						Date of Birth: _____			<input type="checkbox"/> Male <input type="checkbox"/> Female						
<input type="checkbox"/> African			<input type="checkbox"/> American Indian/Eskimo			<input type="checkbox"/> Middle Eastern			<input type="checkbox"/> Asian/Pacific Islander			<input type="checkbox"/> Australian Aboriginal			
<input type="checkbox"/> Caucasian			<input type="checkbox"/> Hispanic/Latin American			<input type="checkbox"/> Mix (check all that apply)			<input type="checkbox"/> Other: _____						
Social Security # (if US citizen): _____						Day Phone #: _____			Night Phone #: _____						
Health Insurance Company: _____						Policy #: _____									
Athlete's Address: _____						City: _____			State: _____						
Parent/Guardian Name: _____						Day Phone #: _____			Night Phone #: _____						
Parent/Guardian Address: _____						City: _____			State: _____						
Primary Care Physician's Name: _____						Day Phone #: _____			Night Phone #: _____						
Primary Care Physician's Address: _____						City: _____			State: _____						
Emergency Contact Name: _____						Day Phone #: _____			Night Phone #: _____						
Do you have any religious objections to medical treatment? <input type="checkbox"/> No <input type="checkbox"/> Yes, Please Describe: _____															
Where do you live? <input type="checkbox"/> With Parents or Other Family Members <input type="checkbox"/> Independently <input type="checkbox"/> Group Home <input type="checkbox"/> Institution/Facility															
Please list any medications, vitamins or dietary supplements below (include birth control or hormone therapy, if applicable).															
Medication, Vitamin or Supplement				Dosage		Times per Day		Medication, Vitamin or Supplement				Dosage		Times per Day	
Please check which of the following vaccines the athlete has had.															
<input type="checkbox"/> Anthrax			<input type="checkbox"/> Influenza (flu)			<input type="checkbox"/> Pertussis (DTP)			<input type="checkbox"/> Small Pox						
<input type="checkbox"/> Chikhepox (VZV)			<input type="checkbox"/> Japanese Encephalitis			<input type="checkbox"/> Pneumococcus			<input type="checkbox"/> Tetanus (DTP)						
<input type="checkbox"/> Diphtheria (DTP)			<input type="checkbox"/> Lyme Disease			<input type="checkbox"/> Polio			<input type="checkbox"/> Year of last dose: _____						
<input type="checkbox"/> Hepatitis A			<input type="checkbox"/> Measles (MMR)			<input type="checkbox"/> Rabies			<input type="checkbox"/> Tuberculosis						
<input type="checkbox"/> Hepatitis B			<input type="checkbox"/> Meningococcus			<input type="checkbox"/> Rotavirus			<input type="checkbox"/> Typhoid Fever						
<input type="checkbox"/> Hemophilus influenza B			<input type="checkbox"/> Mumps (MMR)			<input type="checkbox"/> Rubella (MMR)			<input type="checkbox"/> Yellow Fever						

Medical Assessment

- Medical history
 - <http://www.specialolympics.org/uploadedFiles/LandingPage/WhatWeDo/Health%20history.pdf>
- Review of medications for potential side effects
- Bilateral blood pressure, pulse, temp, O₂ sat.
- FEV₁, pure tone audiometry, near and far vision
- Bilateral peripheral bone density
- Sports physical with P. T. assessment
 - <http://www.specialolympics.org/uploadedFiles/LandingPage/WhatWeDo/Health%20history.pdf>

Interventions

- Medical Assessment
 - Medical referrals
 - Individualized physical therapy/fitness plans
- Nutrition Assessment
 - Individualized nutrition plans
- Sports Skills Assessment
 - Sports mapping
 - Special Olympics coaching

Nutrition Assessment

- Nutrition Assessment
 - Height
 - Height
 - BMI
 - Waist and hip circumference
 - 20 minute nutrition interview



Results – Athlete Profile

- 40% knew their neurodevelopmental diagnosis
 - 26% genetic, 11% perinatal, 3% acquired
 - 16% had a ND associated with cardiac defects
- 21% had previous bone fracture
- 32% had previous sprain
- 4% had previous concussion

Sports Skills Assessment

- 20 tests across 7 skill domains
 - Power
 - Speed/Agility
 - Flexibility
 - Coordination
 - Balance
 - Strength
 - Aerobic Fitness



Results – Medical Profile

- 40% athletes taking prescription medications
 - 25% were taking medications that could negatively impact athletics
 - => BMD .61 lower for at-risk group
 - => BMI 5% higher for at-risk group
- 6% had undiagnosed HTN
- 6% had > 20 mm/hg difference in R. vs L. BP

Results - Medical Referrals

- 85% of athletes required some form of follow-up
 - Average of 2.6 referrals per athlete
 - Hearing (9%)
 - Vision (33%)
 - Dental (13%)
 - Podiatry (21%)
- Athletes/Families were contacted after 3 months
 - 21% of referrals were unknown to athletes
 - 44% of remaining referrals were followed-up
 - 56% of remaining referrals were not followed-up

Interesting Trends

- Athletes with the fewer medications and health referrals tended to have higher initial athleticism scores
- Athletes with more health referrals improved significantly more, comparatively
- Athletes who had individualized plans improved more than those who didn't
- Athletes with greater family involvement had better follow-up on healthcare referrals

Results - Nutrition/Lifestyle

- Meals eaten at home ↑
- Water consumption ↑
- Weekly exercise time ↑
- Weekly work time ↑

- Snacking between meals ↓
- Soft drink consumption ↓

Summary

- Healthier athletes are better athletes
- Better health on the field = better health off the field
- The importance of follow-up cannot be underestimated
- Remember to screen for medication effects

Results - Sport Skills

- The 7 domains of the sports skills assessment were used to generate a composite score of "athleticism"
- The same components were retested after 6 months.
- Athleticism scores increased by 10.4% overall

THANK YOU!

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