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Resilience in the Orthopaedic Patient

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Disclosures

None

Objectives

- Introduce the concept of resilience
- Highlight areas of investigation in orthopaedics
- Discuss the incorporation of the concept of resilience into your practice

Introduction

Do not judge me by my successes; judge me by how many times I fell down and got back up again.

- Nelson Mandela

You may encounter many defeats, but you must not be defeated. In fact, it may be necessary to encounter the defeats so you can know who you are, what you can rise from, how you can still come out of it.

- Maya Angelou

Success is not final, failure is not fatal: it is the courage to continue that counts.

- Winston Churchill?

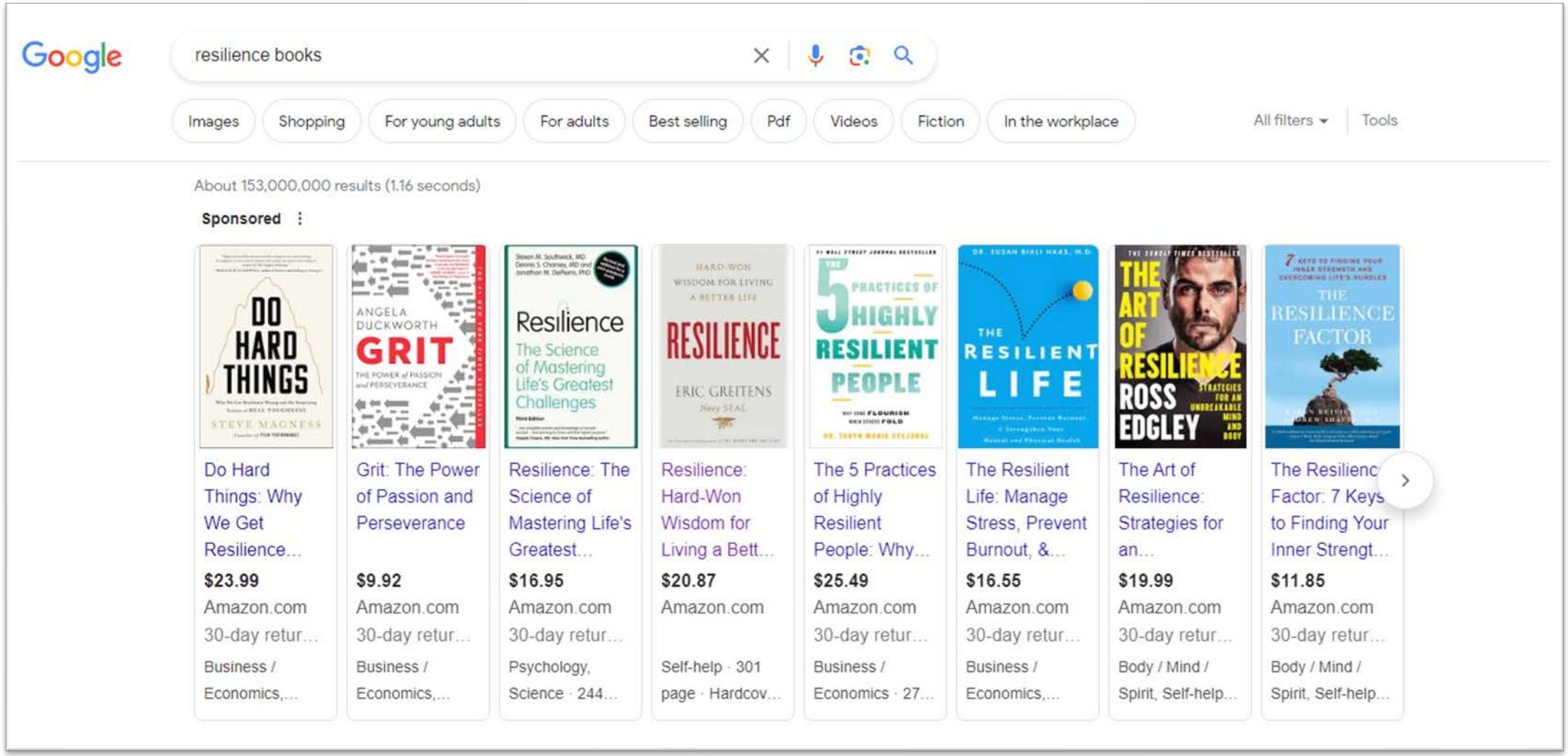
Our greatest weakness lies in giving up. The most certain way to succeed is always to try just one more time.

- Thomas Edison

You gain strength, courage, and confidence by every experience in which you really stop to look fear in the face.

- Eleanor Roosevelt

Introduction



Introduction

resilience

noun

1. The process of adapting well in the face of adversity, trauma, tragedy, threats, or sources of stress

Introduction

Why is resilience of interest?

- **Orthopaedic patients experience major stressors**
  - Injuries
  - Musculoskeletal disease
  - Surgery
  - Difficult diagnoses
- **Does it have prognostic value?**
- **Active area of investigation**

Introduction

What do we know about resilience in general?

- **High levels of resilience are good**
  - Help individuals manage circumstances and "accept" difficult situations
- **Resilience is common**
- **Associated with healthy relationships, confidence, optimism**
- **Resilience can change (for better or worse)**
  - May develop during difficult circumstances

Introduction

Other helpful concepts:

stress The physiological or psychological response to internal or external stressors

distress and **eustress**

stress inoculation The concept that exposure to moderately stressful events serves to build coping resources and may promote resilience to future stress

grit A personality trait that refers to the ability to persevere and maintain long-term goals in the face of adversity

PTSD A disorder that may occur after a life-threatening experience; characterized, in part, by reexperienced trauma and other behaviors

maladaptation A condition in which biological traits or behavior patterns are detrimental or counterproductive

cognitive bias A systematic error in thinking that influences an individual's judgement and/or decision making

Introduction

Other helpful concepts:

anxiety An emotion characterized by apprehension and somatic symptoms of tension in which an individual anticipates impending danger

kinesiophobia A state where an individual demonstrates irrational fear of movement due to concerns over susceptibility to pain and/or injury

pain catastrophizing A maladaptive, exaggerated response to experienced or anticipated pain

patient activation The propensity to engage in adaptive health behaviors

self-efficacy An individual's subjective perception of his or her capability to perform in a given setting or attain desired results

Introduction

What do we know about resilience in general?

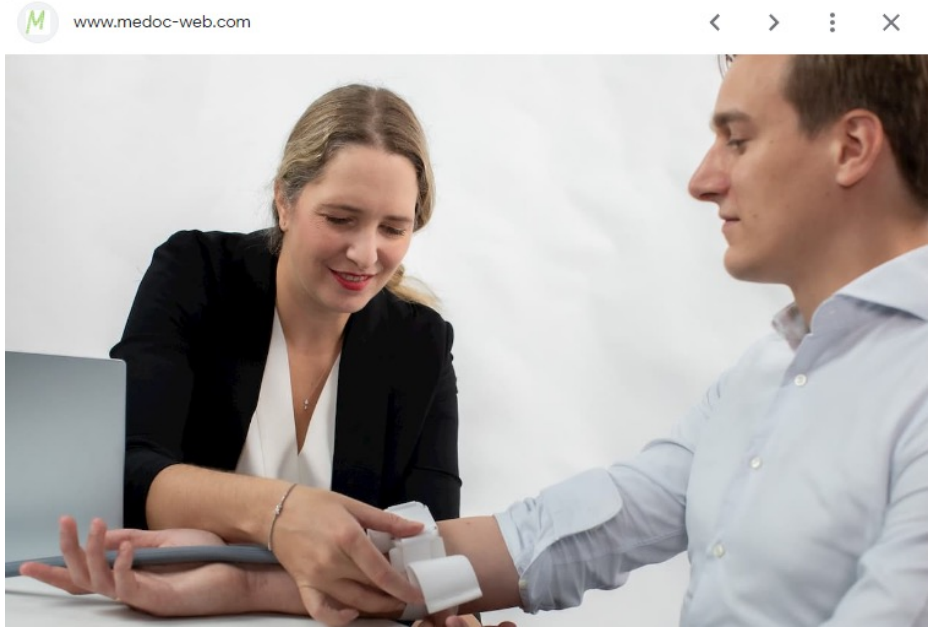
- **Increased age does not necessarily result in increased resilience (31)**
  - Has been found to drop after the age of 60
- **Increased resilience over time has been noted in patients with chronic illness, such as multiple sclerosis and spinal cord injuries (32)**
- **Resilience has been correlated with**
  - Increased self-esteem, life satisfaction, and decreased symptoms of depression (31)
- **May protect older individuals from declining ability to perform ADLs (34)**
- **In chronic condition patients (MS, SCI, etc.), resilience factors (pain acceptance, positive pain beliefs, and positive affect) were shown to be a stronger predictor of psychosocial outcomes than negative factors such as depressed mood (36)**
  - Higher resilience associated with higher quality of life, function

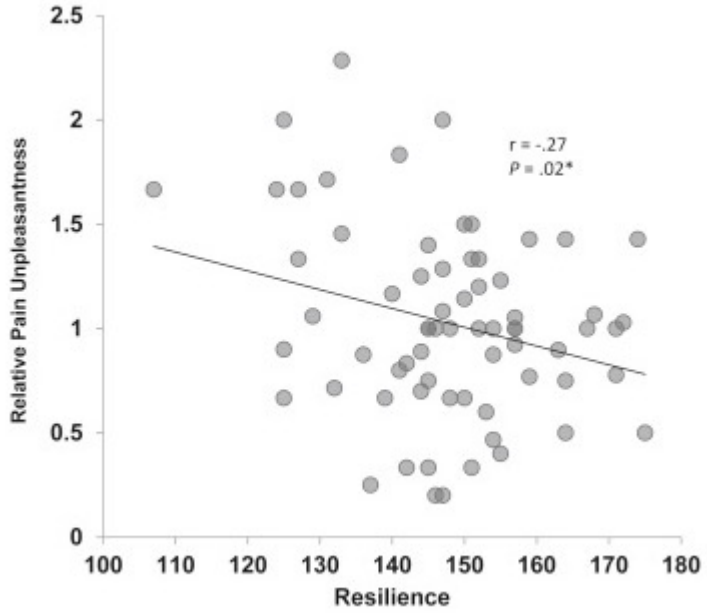
Introduction

What do we know about resilience in general?

- **Hemington et al., J Pain, 2017**
- 68 healthy individuals subjected to a heat probe over the forearm
  - After 30 seconds, participant provided a score of unpleasantness and intensity

- Higher resilience was associated with lower perceived pain
- Resilience protective in those with higher anxiety scores





Introduction

How is resilience measured?

- **>15 measures used**
  - RS (Wagnild and Young Resilience Scale) – 25 items
    - Meaningfulness
    - Perseverance
    - Self-Reliance
    - Equanimity (mental calmness)
    - Existential aloneness
  - CD-RISC (Connor-Davidson Resilience Scale) – 25 items
  - RSA (Resilience Scale for Adults) – 27 items
  - BRS (Brief Resilience Scale) – 6 items

Introduction

CD-RISC 10

TABLE II Content of the CD-RISC-10*

Item Number	Description
1	Able to adapt to change
2	Can deal with whatever comes
3	See the humorous side of things
4	Coping with stress strengthens
5	Tend to bounce back after illness or hardship
6	You can achieve your goals
7	Under pressure, focus and think clearly
8	Not easily discouraged by failure
9	Think of self as strong person
10	Can handle unpleasant feelings

*Reproduced with permission from Jonathan Davidson, MD. This is an incomplete summary of the items on the scale and it is not intended for clinical use or reproduction. Interested users may contact Jonathan Davidson, MD, at mail@cd-risc.com.

BRS

Instructions: Use the following scale and **circle** one number for each statement to indicate how much you disagree or agree with each of the statements.

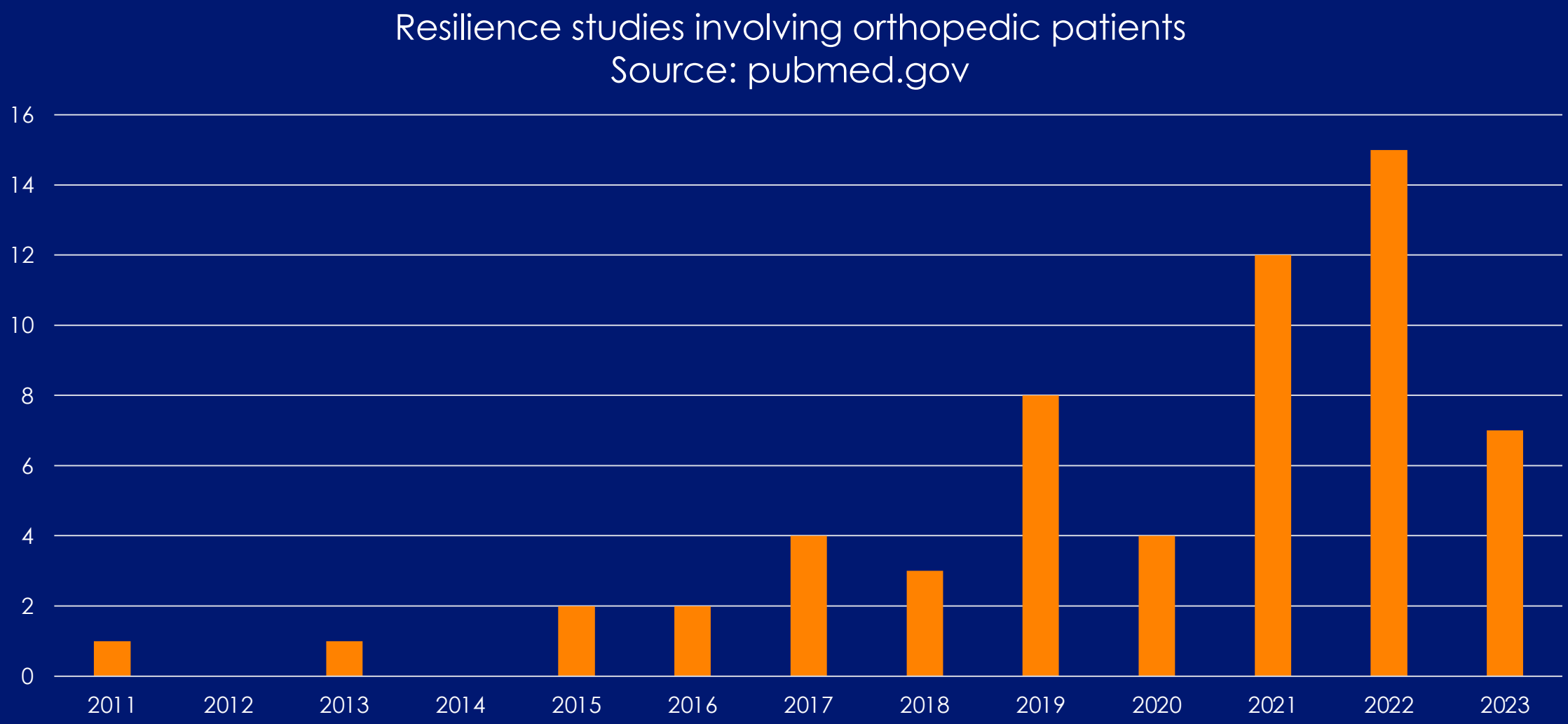
1 = Strongly Disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly Agree

1. I tend to bounce back quickly after hard times.....	1	2	3	4	5
2. I have a hard time making it through stressful events.....	1	2	3	4	5
3. It does not take me long to recover from a stressful event.....	1	2	3	4	5
4. It is hard for me to snap back when something bad happens.....	1	2	3	4	5
5. I usually come through difficult times with little trouble.....	1	2	3	4	5
6. I tend to take a long time to get over set-backs in my life.....	1	2	3	4	5

Scoring: The BRS is scored by first reverse coding items 2, 4, and 6 and then taking the mean of the all the items. Since the items are scored between 1 and 5, the mean you obtain would be between 1 and 5.

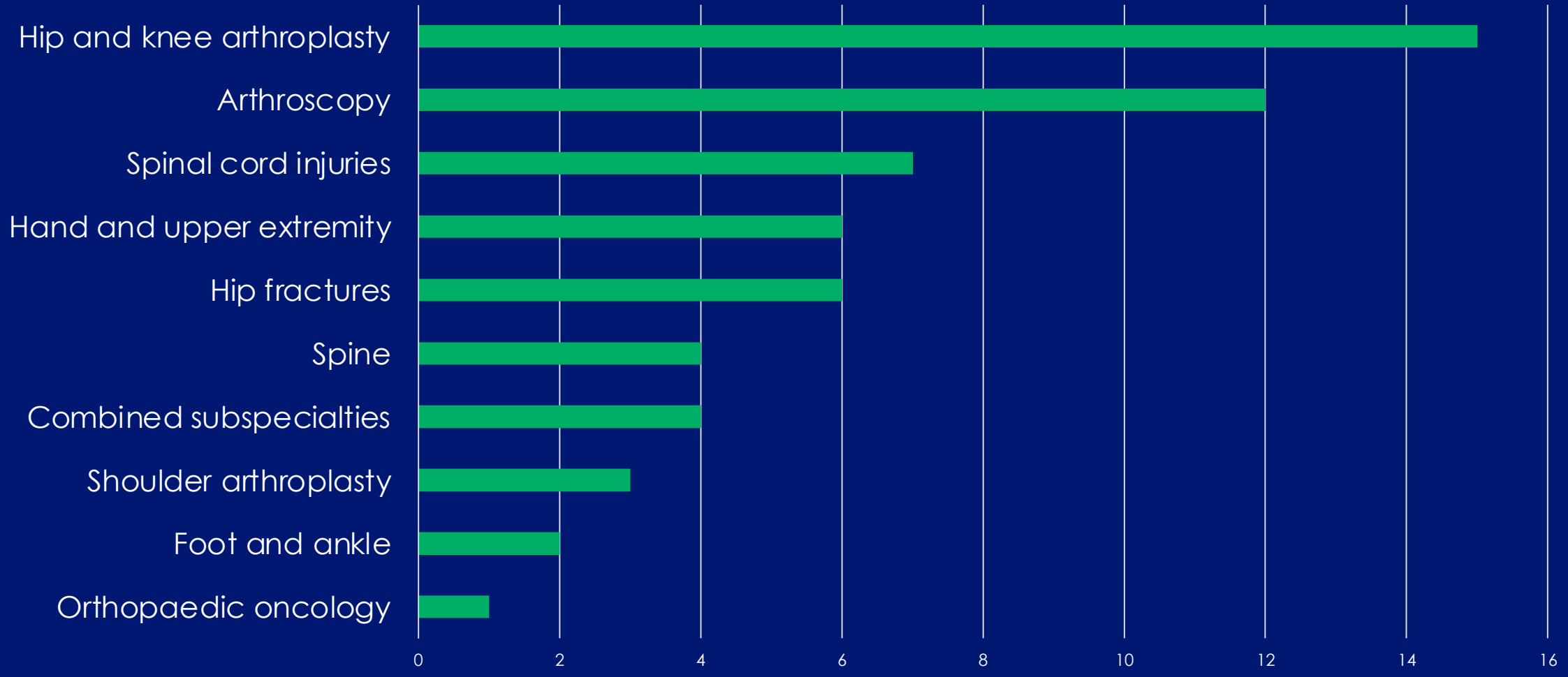
Fig. 1
The BRS. (Reproduced with permission from Bruce W. Smith, PhD.)

Areas of investigation

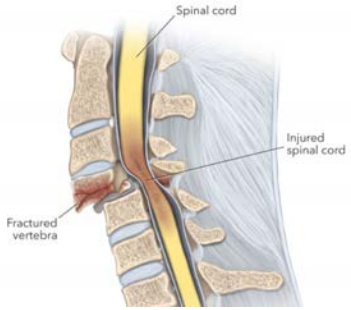


Areas of investigation

Distribution of orthopaedic resilience studies by area of investigation, n=60



Areas of Investigation



Spinal cord injuries

- Majority of patients maintain a stable, low level of anxiety and depression (40)
- 58% maintain moderate to high levels of resilience (41)
- When depressive symptoms were present, 77% of the variance in symptoms was accounted for by perceived stress and resilience (42)
- In a survey of 82 Nepalese earthquake victims with a spinal cord injury, investigators found higher resilience scores in male, employed, and paraplegic (rather than quadriplegic), and those with relieved pain (47)

Areas of Investigation

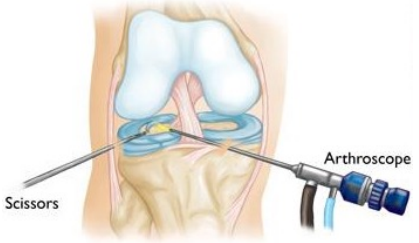
Hip and knee arthroplasty

- Preoperative resilience correlated significantly with overall physical and mental health but not with activities of daily living and knee-specific outcomes at 3 and 12 months(13)
    - Found that patients in the bottom quartile of the KOOS-JR scoring had a significant drop in resilience postoperatively, and the top quartile demonstrated a nonsignificant increase.
- Resilience and Specific Knowledge Score have been found to positively correlate with WOMAC and UCLA scores (85, 86)

- Satisfaction at 3 months was associated with higher initial resilience (59)
- No correlation on satisfaction or postop opioid consumption (87)
- High resilience patients were less likely to use opioids before TJA and utilize lower amounts of opioids while inpatient following surgery (88)

- Increased resilience associated with decreased LOS in THA (89) but not TKA (90)

Areas of Investigation

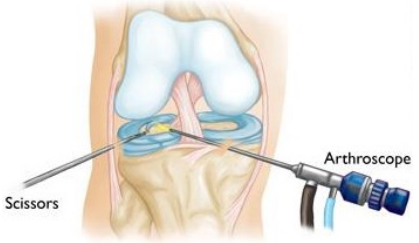


Arthroscopy/Sports Medicine

- **Sonnier et al, Orthopedics, 2023**
  - Highest preoperative resilience scores seen in ACLR group,
  - Lowest scores seen in meniscectomy and PM and RCR groups.
  - Male patients in the shoulder stabilization and partial meniscectomy groups had higher resilience

- Return to sport after ACLR not impacted by resilience score at 6 months postop (92)
- At minimum 2 years after ACLR, normal and high resilience patients had higher SF-12 and lower VAS scores (93)

Areas of Investigation



Arthroscopy/Sports Medicine

- ✓ Military patients with high resilience undergoing an arthroscopic knee surgical procedure, had greater improvements in outcomes at 6 months (61)
- ✗ In non-military, high-resilience patients did not fare better than low-resilience patients with regard to functional outcomes at 3 and 6-months after partial meniscectomy(65)

- ✓ After RCR, resilience significantly impacted sleep quality scores and the frequency of nocturnal intervals of pain relief at 2 week (64)
- ✗ Mental health and not resilience impacted postop ASES scores (94)

- ✓ Military patients with high resilience undergoing arthroscopic shoulder Bankart repair returned to duty more quickly (4.4 vs 6.7 mo) with better functional scores (63)

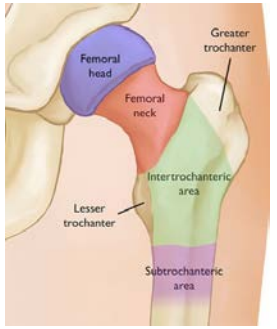
- ✓ In hip arthroscopy, high-resilience patients had better PROMs both preoperatively and 6 months postoperatively (95) and better PROMs at mean 4.6 years (96)

Areas of Investigation

Hand and upper extremity

- ✓ In patients visiting a hand practice, positive psychological variables, including resilience explain 15% of the physical limitations and 23% of the variation in pain (67)
- ✓ In autoimmune conditions, including rheumatoid arthritis, lower resilience was observed in younger patients with lower socioeconomic status, and patients who were >50 years of age had higher resilience scores no matter the socioeconomic condition (69)
- ✗ Resilience and catastrophization did not correlate with the amount of improvement patients had after carpal tunnel surgery (97)
- ✗ After upper extremity fracture, resilience was not associated with PROMIS PF or pain intensity pre-operatively and 3 months post-op (98)

Areas of Investigation



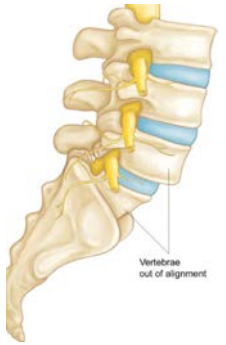
Hip fractures

- Positive correlation between pre-fracture resilience (based on recall) and physical function on the Short Form-36 (50) and low levels of resilience at admission to rehabilitation predicted poorer functional outcomes (22)
- Greater psychological resilience was associated with lower odds of death or new inability to walk at day 60 (99)
- High resilient group had significantly higher walking speed and distance (25 meters more) at 16 weeks than a low resilience group (100)

- Variability in 6 genes (GRM1, NTRK1, NTRK2, GNB3, NPY, and SLCA15) was associated with resilience in 172 patients after a hip fracture, demonstrating a potential genetic component (52)

- Post-operative urinary retention associated with self-efficacy, resilience, and quality of life (101)

Areas of Investigation



Spine

- In patients with cervical and lumbar back pain, low resilience associated with functional disability on the Neck Disability Index (NDI) and the Oswestry Disability Index (ODI) (48)

- In those undergoing a lumbar laminectomy, resilience at the 6-week postoperative visit was associated with improved physical function, disability, pain interference, back pain intensity, and physical activity at 12 months (49)

- Higher preoperative resilience scores related to greater postoperative improvements in back and leg pain, global mental and physical health and EuroQol scores (102)

Areas of Investigation

Shoulder arthroplasty

- ✓ Retrospectively, 2 years post-op, highly resilient patients had higher Penn, Single Assessment Numeric Evaluation (SANE), and ASES (66, 103)

- ✗ Prospectively, resilience did not impact SF-12 and satisfaction (104)

Areas of Investigation

Foot and ankle

- Resilience weakly correlated with decreased postoperative benzodiazepine in all patients but nothing else (105)

- After Brostrom procedures, resilient patients and athletes reported markedly higher physical function scores and less pain (106)

Areas of Investigation

Orthopaedic oncology

- **Gao et al, Pac J Med Sci, 2023**
  - 80 bone tumor patients (mean age 63) were randomly assigned to treatment with and without cognitive behavioral therapy during hospital stay
    - Therapist met alone with patient to discuss thoughts and perceptions about the disease, therapy, prognosis, post-operative self-image and social interaction. "Correction was made against the patient's wrong, negative and unfavorable perception of treatment and recovery."
    - Experimental group had higher satisfaction (95% vs 80%), lower anxiety/depression

Table-II: Comparative analysis of quality of life scores before and after therapy in the two groups ($\bar{X}\pm S$) n=40.

Indicator		*Experimental group*	*Control group*	*t*	*p*
Physical function	Before therapy	42.58 ± 7.63	42.37 ± 7.51	0.12	0.90
	After therapy*	55.47 ± 7.08	51.36 ± 7.87	2.46	0.02
Psychological function	Before therapy	48.50 ± 6.53	48.16 ± 6.77	0.23	0.82
	After therapy*	54.49 ± 7.24	50.43 ± 7.32	2.49	0.01
Social function	Before therapy	60.23 ± 8.59	61.04 ± 8.62	0.42	0.67
	After therapy*	68.27 ± 7.42	63.97 ± 7.82	2.52	0.01
Material life status	Before therapy	42.80 ± 6.15	42.57 ± 6.43	0.16	0.87
	After therapy*	54.39 ± 6.27	50.18 ± 6.07	3.05	0.00

*p<0.05.

Table-V: Comparative analysis of psychological resilience of the two groups before and after therapy ($\bar{X}\pm S$) n=40.

Indicator		*Experimental group*	*Control group*	*t*	*p*
Adaptability	Before therapy	13.86 ± 2.53	13.73 ± 2.55	0.23	0.82
	After therapy*	21.48 ± 3.42	15.31 ± 3.34	12.13	0.00
Toughness	Before therapy	12.63 ± 1.54	12.49 ± 1.70	0.38	0.70
	After therapy*	19.64 ± 2.28	14.57 ± 2.12	10.30	0.00
Control	Before therapy	13.27 ± 2.56	13.04 ± 2.60	0.40	0.69
	After therapy*	22.05 ± 2.12	16.32 ± 2.18	11.92	0.00
Goal achievement	Before therapy	11.82 ± 1.25	12.03 ± 1.13	0.79	0.43
	After therapy*	21.30 ± 3.17	16.31 ± 3.05	7.17	0.00

*p<0.05.

Incorporating Resilience

Why should I consider patient resilience?

- Resilience may affect patient reported outcomes/satisfaction (and vice versa)
  - Factor it into indications?
- Resilience can change over time
- Many of us already use it, even if subconsciously
- Behavioral health integration
  - Belief that it improves outcomes and lowers costs/healthcare utilization
  - Increase availability of mental health professionals
  - Patient satisfaction can impact reimbursement

Incorporating Resilience

- **Ask your patients – utilize Resilience Questionnaire**
  - Questionnaires for other related measures:
    - Self-efficacy
    - Patient activation
- **Biopsychosocial assessment**
  - **Biopsychosocial model A model that systematically integrates biological, psychological, and social considerations in the evaluation of individual disease states**
  - Get a full history
    - Medical/surgical history – outcome after previous surgery, diagnoses
    - Social history – help at home, substance abuse?
    - Psychiatric history – history of depression, anxiety?

Incorporating Resilience

Improving patient resilience

- Psychoeducation
  - Gives info about their illness and training to cope with it
    - Used with mental health conditions
  - Works for orthopedic diagnoses
    - Set expectations, frequent follow up, reassurance
- Cognitive behavioral therapy
  - Goal is to change thinking patterns
    - Recognize distortions
    - Learn about the behavior and motivations of others
    - Problem solving skills – face fears, role playing, relaxation techniques
    - Develop greater confidence
- PT/OT with trained professionals

Incorporating Resilience

Improving patient resilience

- **Vranceanu et al, Injury, 2015**
  - RCT of 48 patients with a fracture
  - Half given CBT and relaxation response strategy sessions
    - 4-6 sessions of visits or call with trained professional
  - Improvements in function, pain at rest, depression, pain catastrophizing, pain anxiety, post-traumatic stress disorder

Areas of Investigation

Conclusions

CURRENT CONCEPTS REVIEW

Resilience in the Orthopaedic Patient

Peters T. Otlans, MD, MPH, Patrick F. Szukics, DO, Sean T. Bryan, MD, Fotios P. Tjoumakaris, MD, and Kevin B. Freedman, MD

Investigation performed at the Rothman Institute at Thomas Jefferson University, Philadelphia, Pennsylvania

TABLE IV Grades of Recommendation

Recommendation	Grade*
Low resilience measures in patients with chronic conditions are associated with poor self-reported mental health outcomes.	B
High resilience in patients with hip fracture is associated with improved early postoperative physical function.	B
In the patient population undergoing an elective orthopaedic surgical procedure, a patient's level of resilience may impact postoperative mental health and functional outcomes.	I
The use of cognitive behavioral therapy and relaxation response strategies in patients who have sustained a fracture results in a reduction in pain intensity and magnitude of disability.	B
Orthopaedic surgeons should consider utilizing resilience measures or other biopsychosocial assessments to help to identify patients at risk of a poor outcome.	I

*According to Wright[84], grade A indicates good evidence (Level-I studies with consistent findings) for or against recommending intervention; grade B, fair evidence (Level-II or III studies with consistent findings) for or against recommending intervention; grade C, poor-quality evidence (Level-IV or V studies with consistent findings) for or against recommending intervention; and grade I, insufficient or conflicting evidence not allowing a recommendation for or against intervention.

Areas of Investigation

Conclusions

- Resilience can change over time
- Other factors at play
    - Resilience affects outcomes and outcomes affect resilience
- Current studies are poorly designed
    - Often data is gathered retrospectively, minimal follow up, no interventions
- How resilience impacts patients is still to be determined
    - Results inconclusive in certain subspecialties – arthroplasty, sports medicine
    - May be more pertinent to certain patient populations – chronic pain, medically fragile, hip arthroscopy, ?worker's comp, adolescents
    - Need more sophisticated studies

- Despite this, resilience as a measure still intrigues
    - Easy to collect, modifiable factor, may impact outcomes and perceptions
    - May increase in relevancy – aging patients, anxious patients

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Thank you!

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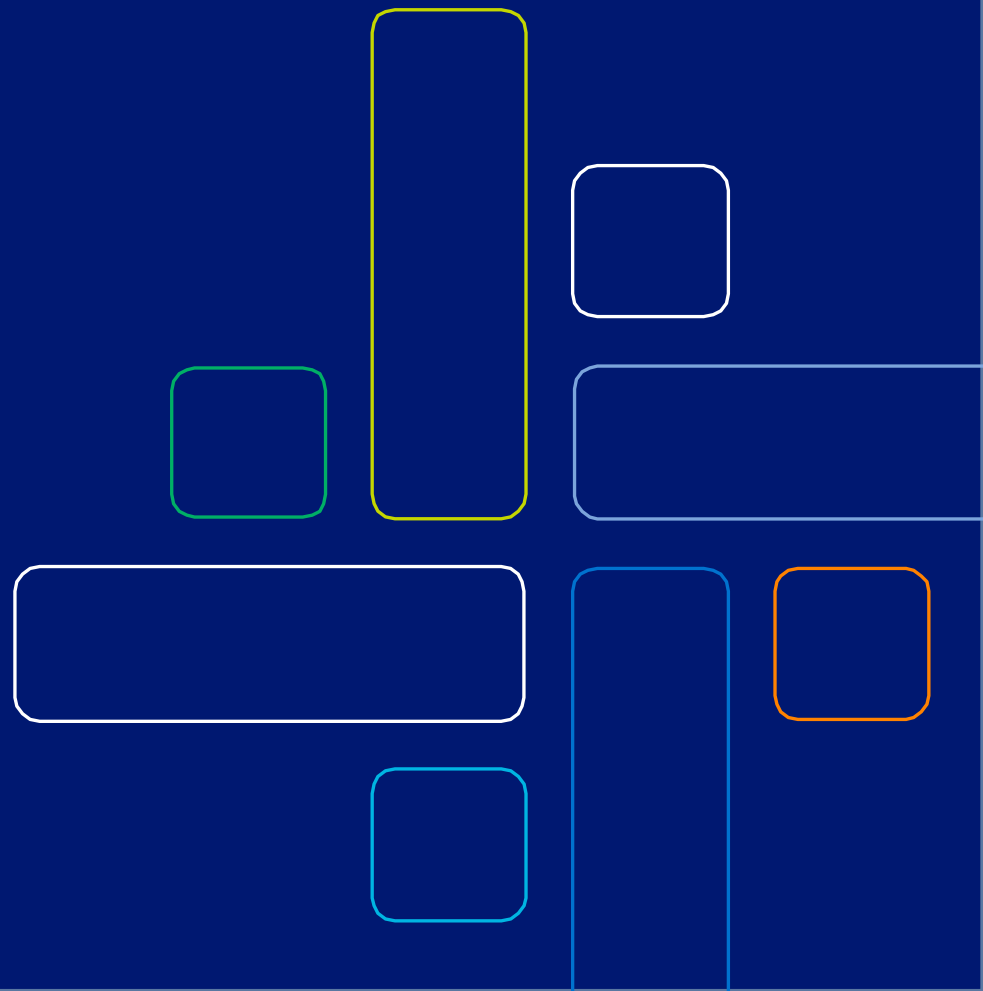

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